REVIEW OF GROUND WATER CONTAMINATION

HEARING

BEFORE THE

SUBCOMMITTEE ON ENVIRONMENT AND LABOR

OF THE

COMMITTEE ON SMALL BUSINESS
HOUSE OF REPRESENTATIVES

ONE HUNDRED FIRST CONGRESS

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REVIEW OF GROUND WATER CONTAMINATION

TUESDAY, NOVEMBER 14, 1989

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENVIRONMENT AND LABOR,
COMMITTEE ON SMALL BUSINESS,
Washington, DC.

The subcommittee met, pursuant to notice at 9:30 a.m., in room 2359-A, Rayburn House Office Building, Hon. Esteban E. Torres (chairman of the subcommittee) presiding.

Chairman TORRES. Good morning, ladies and gentlemen. I want to thank you for coming in this morning.

This is one of a series of hearings that this subcommittee has scheduled on the issue of ground water. I appreciate the patience that so many of you have and that you have displayed in adjusting your schedules to be here early in the morning and, of course, being able to stay with us as long as you can to attend this hearing.

As I mentioned, ground water is our topic today. I should ask a question. Do we, in fact, have a national ground water problem? The corollary to that, is the Federal Government devoting sufficient time and resources to this issue?

I have requested that we hear from a number of people with different views on this matter. First, we will hear from a representative from the San Gabriel Valley Watermaster's Office about the severity of the problem in the San Gabriel Valley in California.

As most of you know, the San Gabriel Valley includes the area that I represent, the 34th Congressional District of California. It has some of the worst ground water contamination in the United States.

The second panel that we will be hearing from today will consist of representatives from the Environmental Protection Agency to explain the Federal programs currently in place and those that are planned for the future.

Finally, representatives from the environmental community will share with us their thoughts on the current and future state of the resource.

I believe that ground water is one of our most important and yet most easily ignored natural resources. For many years, everyone, including the scientists, believed that ground water was essentially pure. It was believed that ground water could not be contaminated by surface activities. Now we are seeing in very frightening numbers that this is not the case. Yet the myth persists.

This philosophy about out of sight and out of mind, or what you cannot see cannot hurt you, seems to reign supreme. We simply

cannot have that any longer because 117 million people rely on ground water as their primary drinking water in this country. The crops and the animals that all of us consume are nurtured on ground water. So, we have a responsibility to see to it that the essential resource, ground water, is kept safe.

As many of you know, in my own district in Southern California, we have the worst case of ground water contamination in the western United States. No one really knows why. A million people in the San Gabriel Valley rely on the San Gabriel Ground Water Basin as their primary drinking water. Contamination by volatile organic compounds has rendered 60 wells in the San Gabriel Valley, at this moment, unfit for human use. We have seen contamination at levels 360 times above the norm that is considered safe by EPA. Yet we do not know why, or if the pollution is continuing.

What we have come here today to find out is whether the ground water available for Americans who rely on it is as polluted as it is in the San Gabriel Valley. If it is not that polluted yet, what are we going to do to prevent that from happening in the future?

With the consent of my colleagues, I would like to submit for the record a report on ground water that has been prepared by the subcommittee staff. It is called The Torres Report, a Ground Water Crisis. I would like to, at this point, enter this into the record.

Copies of this have been provided to the members, and there are a few copies available to the public.

[The report and Mr. Torres opening statement may be found in the appendix.]

Chairman TORRES. I would like to once again thank you for being here this morning.

My colleague, Mr. Hiler, has just joined us, and I would like to, at this time, turn to him to see whether he has an opening statement.

Mr. HILER. Thank you, Mr. Chairman. I want to apologize for being several minutes late and to apologize for coming in and out over the course of the morning. The Banking Committee is also having hearings on money laundering, with one of the chief couriers from the Colombian cartel testifying, as well as the continuing hearings on the Lincoln Savings and Loan matter. So, I will be in and out.

But I want to, of course, applaud you for continuing to have this subcommittee delve into the issue of ground water pollution and its impact on small business, in particular, but its impact on the type of America that we do not want to live in.

I know of your particular interest in the problem with the aquifer down in your area of California, but I know that we will also be receiving testimony from others today about the general subject of ground water pollution. I would hope at some point that we will also have testimony from some of the—I am sure we will—from some of the other Members' districts who are also having ground water problems.

I know my district has had a number of ground water pollution problems and they are very, very difficult problems to resolve. The price of real estate begins to drop when there is the threat of ground water contamination having occurred. How we ensure that

cleanup takes place in a prompt and efficient way, and maintain the property value and the real estate value of the small businesses and homeowners in our areas, and having, of course, clean safe water to drink is extremely important.

So, I think it is appropriate that this subcommittee, as an environmental and labor committee, has a heavy emphasis on ground water because it clearly is one of the most significant, most important problems that our country faces. With that, I would yield back, Mr. Chairman.

Chairman TORRES. Thank you, Mr. Hiler, for your important remarks this morning. I, too, should be joining you at the the full Banking Committee hearings for the witness that you stated you will be hearing this morning. Unfortunately, I have to stay, and I recognize that you will be going in and out, and that is understandable.

So, thank you for being with us this morning so we could open the hearings.

Our first panel, so to speak, is going to be the San Gabriel Valley Ground Water Contamination—well, that is the issue.

Mr. Tim Jochem, who is the Ground Water Basin Project Manager/Assistant Superfund Project Manager, San Gabriel Valley Superfund Site; is that correct?

Mr. JOCHEM. That is correct.

Chairman TORRES. You are our first witness, and, sir, you may proceed.

Let me advise you that your entire statement will be placed in the record. It will be printed in the record as such. Your comments, as noted here, will be taken. We request you summarize to cut down the amount of time that we will need. Please proceed.

TESTIMONY OF TIMOTHY C. JOCHEM, PROJECT MANAGER, MAIN SAN GABRIEL BASIN WATERMASTER

Mr. JOCHEM. Thank you, Congressman.

I am Tim Jochem. I am also the project manager with the Main San Gabriel Basin Watermaster's Office. I have a few slides to help illustrate some of what I am going to say. Just a few.

Chairman TORRES. Mr. Jochem, are your slides in such a graphic state that they can be entered into the record?

Mr. JOCHEM. I can do that for you.

Chairman TORRES. Would you please?

Mr. JOCHEM. Yes.

Chairman TORRES. Thank you.

Mr. JOCHEM. Yes, sir. The Main San Gabriel Basin is located on the southern California coastal plain about 12 miles east of downtown Los Angeles. On this map it would be the two shades of yellow area up near the top of the map and curling down toward the middle.

The basin covers about 170 square miles of area, including the watersheds which are located up on the top edge of that map.

About 90 percent of the water supply needs of the San Gabriel Valley are met through the utilization of this ground water basin while the remaining 10 percent of those needs are met through imported deliveries from two agencies that serve our valley.

There are 46 water suppliers that produce water out of this ground water basin. They include municipalities, privately owned water companies, small mutual water utilities, and county water districts.

We entered into a judgment by the Los Angeles Superior Court in 1972 which adjudicates this ground water basin and creates a prescriptive water right for the water producers, and, as a result, the Watermaster's Office is required to closely monitor and regulate the production of water out of this basin.

The average yield out of this basin, and there are 248 active wells currently, is about a quarter of a million acre feed, which is about 80 billion gallons.

The basin is situated within the highly permeable alluvial fan of the San Gabriel Mountains, and similar to what this slide shows, simplistically described, our basin is like a large rock bowl full of gravel, clay, and sand. The basin is basically homogeneous as this slide would represent and extends down to about 4,000 feet in the center.

We estimate potential storage capacity of this basin to exceed 8 million acre feet of water, which is quite a bit of water comparatively. But we only utilize 5 percent of this because we have limited natural recharge in the basin. We only receive about 18 inches of rain annually, and a lot of that water percolates down through the valley floor and helps recharge the ground water basin.

One might say that the ideal geologic characteristics of this basin have been somewhat negated by where the basin is situated geographically and that is because the geologic environment permits this great ground water resource of the area, paradoxically, renders it somewhat extremely vulnerable to contamination such as from water percolating down to the water table carrying surface-borne contaminants with it down to the actual water-bearing strata of the basin.

Chairman TORRES. Mr. Jochem, before you turn the slide, the two areas in blue, the lower confined aquifer or layer that is protected by that brown layer there of clay or whatever that is?

Mr. JOCHEM. The unconfined layer is generally unprotected.

Chairman TORRES. The light blue one.

Mr. JOCHEM. Yes; it is essentially open to——

Chairman TORRES. To contamination.

Mr. JOCHEM. Yes.

Chairman TORRES. I see.

Mr. JOCHEM. The bottom aquifer at one time we felt or the bottom water-bearing strata actually—it is basically one aquifer—the bottom water-bearing strata we thought at one time entirely protected from surface-borne contaminants, but the inconsistency of those confining layers has started to indicate to us that is just not the case. We are starting to see contamination very deep in this basin.

Chairman TORRES. So, lower, when it is not confined—it is unconfined?

Mr. JOCHEM. It is confined in a geologic sense. But there are definitely avenues where contaminants can migrate down to that region.

Chairman TORRES. You show there in the graph—is it a well going down into the unconfined, and there is sort of a fuzzy blot there?

Mr. JOCHEM. Yes; that is correct.

Chairman TORRES. What does that indicate?

Mr. JOCHEM. That is just a representation of what a typical production well might look like.

Chairman TORRES. The ones that extend into the lower confined layer, it is the same, it is just a deeper well then?

Mr. JOCHEM. That is correct.

Chairman TORRES. When we are talking about water contamination in the San Gabriel Valley today, we are talking about those two aquifers being contaminated?

Mr. JOCHEM. Yes, sir.

Chairman TORRES. OK. Thank you.

Mr. JOCHEM. We are not certain how deep it goes. Typically, a well might be only on the average of 1,000 feet deep in the valley. We have not seen too many deeper than 1,200 feet. But we do know that the contamination currently is down to about 700 feet.

Chairman TORRES. Thank you.

Mr. JOCHEM. OK. We have seen a lot of agricultural activity in the basin from the 1920's to about the 1960's. We do have some of the problems associated with agricultural activities. Not necessarily pesticides and herbicides that often are characteristic to agricultural activities, but nitrate contamination. This has been, as well, a fairly big problem in the basin.

Those areas shaded in green on this map show where we have identified nitrate contamination in the basin. It covers less than about a quarter of the total surface area. This nitrate contamination tends to exist in the most shallow water-bearing strata of the basin.

Nonetheless, about 30 wells have been deactivated because of the excessive nitrate contamination in the basin, primarily because denitrification is just not a cost-effective technology currently. The producers are employing two basic strategies to address nitrate contamination.

One is to abandon the shallower wells where the nitrates exist at the higher level and drill deeper wells. They have been able to do that fairly successfully with moderate impact.

Second, employ a blending strategy where they inblend a contaminated well with a well exhibiting little or no contamination and essentially blend down those—dilute those concentrations prior to delivering that water to their customers.

The occurrence of organic chemical contamination in our basin was discovered around 1980. Sources of this contamination we know include chemical storage facilities, industrial discharges, illegal dumping, and landfills, to name a few. You can see how those ultimately can affect the ground water table there with their downward migration.

These problems did not occur overnight. Clearly, they have developed over the 40 years following World War II as business and industry developed in the San Gabriel Valley. Typically, the organic chemicals that we do see are of the chlorinated hydrocarbon species, and they include the solvents and degreasers—trichloroethy-

lene, tetrachloroethylene, dichloroethylene, and carbon tetrachloride. These chemicals are very common to the industry of the southern California areas, primarily the electronics and aerospace industries.

Generally, these compounds have very low maximum contaminant levels in drinking water, which make even small releases to the environment potentially destructive. For example, a gallon of tetrachloroethylene can render 100 million gallons of water undrinkable by current health standards.

To date, over 80 wells in the basin have exceeded drinking water standards for organic chemicals. Over half those wells have been deactivated. The other half are either blended with uncontaminated sources where that is possible or they have been equipped with treatment facilities, which are expensive.

Similar to the producers' response to the nitrate problems, they have drilled deeper wells, and we felt initially that this appeared to be a reasonable approach to the contamination problem. However, our available data indicates that the practice of drilling deeper wells to avoid organic chemical contamination may serve to spread the contamination through the basin more rapidly, ultimately affecting more wells.

As I stated before, we have already seen contamination as deep as 700 feet. We believe that is at least partially the result of the drilling of deeper wells in this basin.

Currently the estimated extent of organic chemical contamination in the basin covers approximately 40 square miles, which is about 25 percent of the total basin area. Our computer model seems to indicate that this contamination is continuing to spread at a rather rapid rate. As this map shows, those shaded areas represent where organic chemical contamination has been confirmed in the valley. There are a great deal of those wells that have been deactivated, reside right in the red areas of the plumes that are represented on that map.

Our computer model also shows us that probably, within the immediate future, an additional 15-square-mile area will be affected by the spread of these contaminant plumes, ultimately affecting 30 to 40 more wells.

Consequently, if some aggressive remediation activities do not take place, we could see this contaminant plume continue to spread and conceivably affect every single well in this ground water basin.

Chairman TORRES. Every single well?

Mr. JOCHEM. Potentially, yes, sir. The EPA first became involved with us in this problem in 1983 and the basin was placed on the Federal Superfund Priority List in 1985, and that is kind of a dubious distinction for a ground water basin.

In that time that has elapsed since the EPA became involved, they have done some extensive studies and evaluation of the water quality problems of the basin. We have seen the construction of one treatment facility for a small mutual water utility in the El Monte area, very near my office. They are proposing the construction of additional ground water treatment facilities at the bottom part of the basin which is that area where the plumes seem to be running off that map. Ultimately, they believe that will help con-

tain our water quality problems to our basin and not let them migrate south to the adjacent ground water basin.

Chairman TORRES. Could you identify that area as it runs off the map? That is on the left, down on the lower left.

Mr. JOCHEM. Yes, sir. This region here, which is known as the Whittier Narrows Area. The primary hydraulic interconnection between the San Gabriel Basin and the Central Basin to the south.

Chairman TORRES. That is where the treatment is taking place, you say, to impede or avert the plume moving down into the Central Valley Area?

Mr. JOCHEM. Yes; that is where the proposed treatment facilities will be located.

Chairman TORRES. Perhaps a question at this time would be, why would they do it there and not up at the higher area where the plume is more severe.

Mr. JOCHEM. We wonder about that too, Congressman. Although they have their motivations, and they have their own agenda with dealing with environmental problems, and certainly they are difficult in our local perspectives.

Chairman TORRES. But you, in terms of this project, ask the same question. You wonder why.

Mr. JOCHEM. Yes; certainly if I had my preference, I would like to see any resources committed to solving the problems within my ground water basin.

Chairman TORRES. Indeed; please continue.

Mr. JOCHEM. OK. The EPA has told us that a comprehensive cleanup of the basin may run as high as $800 million and take decades to accomplish.

Although it sounds pretty bad, much of the drinking water supplies of the San Gabriel Valley currently exhibit measurable concentrations of both organic chemicals and/or nitrates, but most or all of the water that is currently served to the public presently meets all drinking water standards, although some just barely.

It could be said, though, that the risk to public health from drinking water supplies has been at least minimal, so far. Primarily, the impacts we have seen from this contamination have been more financial in nature. Assigning total dollar values is rather difficult, but capital losses can be quantified.

Typically, the present capital worth of a ground water well in the San Gabriel Valley is about $350,000. That excludes the current property value on which that well is located because the property can be sold off and does not represent a capital loss.

Therefore, we could estimate financial impacts from the chemical contamination, either nitrate or organic chemicals, at approximately $25 million to date. These capital losses do not directly impact water rates, although cost to cover those losses, such as replacing a deactivated well, or developing alternative source of supply, or providing treatment facilities can and will continue to increase the cost that the public pays for potable water service in the San Gabriel Valley.

Additionally, any future costs for clean up of the basin that is not either funded by State or Federal funding mechanisms, or responsible parties, will undoubtedly be paid for by the water utilities and ultimately by the public.

We have become so heavily dependent on this ground water basin that the question of cleanup becomes strictly academic. We must cleanup this basin and restore it.

The potential risk to public health cannot be underemphasized. If extensive cleanup actions do not take place in this basin, the problem will continue to escalate to the point where risk to public health from the drinking water becomes likely.

From a local agency perspective, we are currently developing remediation plans, institutional plans, and administrative plans, consistent with EPA's ultimate plans for cleanup in this basin.

We are taking this action somewhat as an interim action to minimize the further impacts to the public and the ground water producers of the basin in the hopes that future EPA actions are forthcoming as far as dealing with the most serious problems that we are experiencing.

Hopefully, we will see responsible parties split a big part of this bill. Although the physical characteristics of the basin, as well as the dynamics of the ground water environment, may make this task impossible at worst and very, very resource intensive at best. We are pursuing alternative funding mechanisms, but we realize that as one of only 1,200 Superfund sites in the Nation, there is stiff competition for alternative funding to address environmental problems.

The unfortunate possibility exists, that if we do not see outside assistance in addressing our problem, a good percentage of the necessary basin cleanup could be funded out of the water-using public of San Gabriel Valley. That about concludes my testimony.

[Mr. Jochem's statement, with attachments, may be found in the appendix.]

Chairman TORRES. Thank you, Mr. Jochem, for a very good presentation, very detailed and graphically illustrated to help us understand this problem.

Before I get into some questions with you, I would like to welcome my colleague from New York, Mr. Engel, who has just joined us. I appreciate his being here and providing attendance. I know that he came in at the midpoint of your presentation but Mr. Engel has a similar contamination problem in his own district dealing from a large landfill there and perhaps other areas that I am not aware of.

Mr Engel, I would like to yield the floor to you if you have any opening statements to make relative to your district or to this particular presentation today.

Mr. ENGEL. Thank you very much, Mr. Chairman.

I am very gratified that you are holding today's hearing on ground water contamination. I know that the problem is a very crucial one, certainly in your district, but I think for all of us in the Congress from all across the country.

We had a subcommittee hearing in Baldwin Park, and I look forward to participating with you in many of these hearings because when we speak of environmental matters, ground water contamination is like a time bomb. A lot of people are not aware that the problem exists, and I think we are seeing more and more that the problem is not a regional one, but it is certainly a problem that all of us have to really take into account.

In recent years, we have become more and more aware of harmful chemicals which contaminate our air and water. Thanks to the Superfund Program, we are now in the process of identifying and cleaning up polluted areas.

I read your report, Mr. Chairman, and I think it is amazing. The very first conclusion you stated was almost 10 years have passed since Aerojet first reported ground water contamination at levels 360 times the allowable State action levels, and, as of January of this year, not one drop of water in the San Gabriel Ground Water Basin has been cleaned up as a result of EPA efforts. I think that is just shocking. It is necessary for us in Congress to strengthen environmental laws and regulations to prevent these types of things from occurring in the future.

As you are aware, Mr. Chairman, from your visit to my district earlier this year in New York City, I have a landfill in my district which is leaking chemicals into East Chester Bay and the surrounding ground water, and the Federal, State, and city governments are all working together to clean up this hazardous waste site. I note that this is the first time we have had Federal intervention in the dump, where there had been a total lack of Federal interest in the past.

For the first time, we now have Federal interest and Federal work is coming into my district to look at the dump, and to survey the dump, and that is really in large part through your efforts, Mr. Chairman, and the hearing we held in my district.

So, I want to again thank you for it and tell you that I remain deeply concerned and interested in protecting our neighborhoods from the dangers of improperly disposed hazardous waste and all environmental concerns.

Again, I commend you for holding today's hearing, and I look forward to working closely with you and the subcommittee on this important matter. Thank you.

Chairman TORRES. Thank you, Mr. Engel, for your comments. I know that you have a pressing schedule as well. Mr. Hiler has left for the Banking Committee hearings, and I know you have some work that you have to attend to.

At this time would you want to phrase a question to our presenter about something that he might have said that could be relevant to your own area? I would give you that opportunity at this time.

Mr. ENGEL. There is one question I would like to ask, and I missed the first part of your testimony, but I will certainly read it.

We see, in this country, and I have felt this way for a long time, and again I think the chairman in his opening statement mentioned the philosophy of, "out of site, out of mind" and "what you can't see can't hurt you" seems to reign supreme. That has been my feeling in terms of the environmental problems facing this country. When you speak about ground water contamination, we had all been led to believe that water underground is pure, and healthful, and all these other things.

I was just wondering, in your experience, do you feel that the seriousness of this problem is finally catching on and that the powers that be, and the people in the agencies, and the people that need to know are finally waking up to the reality that this poses a tremendous health hazard and problem?

I am new to Washington, but I am not new to elective office. I served for 12 years in our New York State Legislature. Government seems to so often respond so slowly to these problems and cutting through the bureaucracy is something that literally can make you scream.

I am just wondering if, in your experience, you have seen, as we are moving into the nineties, hopefully, some change in attitude, that Government is perhaps responding quicker and better toward the way it ought to be responding.

Mr. JOCHEM. Yes; I think I have to agree. Over the last decade I think we have seen a growing amount of attention to ground water quality problems, not only in the San Gabriel Valley but nationwide, from what I am starting to read. I think the outlook is starting to look somewhat optimistic anyway for future ground water management in the Nation.

Mr. ENGEL. This is a new subcommittee of the Small Business Committee. When Mr. Torres was appointed chairman, and knowing of his background and concern with environmental matters, I was very anxious to serve on this subcommittee because the Small Business Committee is not one that has a tremendous legislation coming out of it but is one that can have tremendous oversight, powers of oversight. I think that is what we are trying to do here.

So, I again want to commend you, Mr. Chairman, because I think what we are doing here is really shedding light on a problem that is prevalent across the country. I would imagine that we have a number of Members, a number of colleagues, who do not even realize that their districts are suffering the same kinds of problems that your district and my district have been suffering in terms of environment and the impact on small business. The impact just on the community at large is something that I know, as we approach the nineties, we are going to have to look at more and more.

Chairman TORRES. Thank you, Mr. Engel, for your statements, and, of course, we greatly value your participation on this because you obviously are having this problem. You are cognizant of the issue, and it is important that we have people like that serving.

I would like to ask Mr. Jochem, from your perspective, based on what you know, can you give us an idea of where the pollution really came from? I mean do you know of a major polluter? Mr. Engel mentioned Aerojet, and that is a documented fact. What do you know about that?

Mr. JOCHEM. We do not know a lot. Really that is sort of, not in a pejorative term, not our fish to fry. We know actions are being taken to identify responsible parties in the San Gabriel Valley, both from the perspective of EPA and our local regional Water Quality Control Board. We are seeing their inspection reports which are coming across my desk by the scores. Ultimately, there could be thousands of possible, responsible parties in the basin. Hopefully, some of them are, excuse the pun, solvent enough to be able to put out some dollars to help clean this up.

Chairman TORRES. In your statement, in your description of the valley 40 or 50 years ago, you described agriculture as a major culpable factor, nitrates, if you will.

Mr. JOCHEM. Yes.

Chairman TORRES. As you and I know, we no longer entertain a large agricultural community there. That has all been highly developed.

How would one at this point be able to go back and find responsible parties given the demise of agriculture in the area?

Mr. JOCHEM. I would say it is highly unlikely. Those are problems that occurred probably, or at least originated, in the thirties, forties, fifties, and those agricultural concerns are long since gone. I think, frankly, we will never find responsible parties for the nitrate problem.

Chairman TORRES. What specific activities, may I ask, has the Watermaster undertaken to contain the contamination and to guarantee that the consumers have a clean water supply?

Mr. JOCHEM. Currently we are awaiting the EPA Technical Plan to help develop our own technical remedies from that. We do not want to work inconsistently with any other Government agency that is going to commit resources; we want to work hand in hand with them.

So, as far as that goes, we are waiting for that EPA Technical Plan and, as you know, that is due out at the end of the year.

Additionally, we are looking at developing institutional and administrative plans to either create another local agency empowered with water quality management in the basin, as one separate agency does not exist now, or take measures to empower the Watermaster to do whatever necessary activities—to do things like controlling pumping patterns—just to minimize the spread of contamination. To levy assessments necessary to operate and maintain water treatment facilities.

We are developing those plans now, and we look for those plans to be finished within the next couple of months. I think through the following year we will be implementing some of those actions identified in those plans.

Chairman TORRES. Am I to understand that under the Watermaster there is no large-scale management plan, one where all the purveyors are brought together, and there is coordination and strategies plotted out?

Mr. JOCHEM. No; it has primarily been, up to this point, a cooperative effort. Everybody just kind of agrees to move in one direction. We get the superior court to accept what we want to do, and we move in that direction. There essentially has not been the need until recently to put together any hard and steadfast rules and regulations about operating the basin.

Chairman TORRES. I would like to continue the line of questioning here because it has been very good. You have answered some very good questions, I think, that help our hearing. As you know, these are the hearings in which we build a legislative history, an understanding of the nature of the problem and what we might be able to do with it.

Just one more question. From your experience, do you think that the current environmental laws, the alphabet soup of our environmental laws, RCRA, TRCRA, FIFRA, and CERCLA, the Clean Water Act, the Safe Drinking Water Act, do they adequately protect the ground water from future contamination?

Mr. JOCHEM. I think the body of the laws themselves have the potential for doing just that. I often wonder if enough resources are committed to implementing those laws and managing them adequately—seeing things like unfunded programs that are required under certain laws definitely is a concern.

Chairman TORRES. In your capacity there with the Watermaster, and, perhaps, the Watermaster has not taken a position, but I would be interested to hear from you. What is the Watermaster's feeling about the proposed Azusa landfill which is a controversial issue at this point?

Mr. JOCHEM. The Watermaster has gone on the record with the State Water Resources Control Board as opposing that landfill expansion. There is some evidence that suggests that the existing landfill itself may have led to some of that contamination, as one of my slides represented, although that has not been yet confirmed. The Watermaster essentially wants that issue addressed before any greater amount of garbage is allowed to come into that site.

Essentially, their position is that all landfills will leak at some time over the course of their lifetime and ultimately that will just create greater problems for an already fairly serious problem.

Chairman TORRES. I do not want to put you on the spot, and I will do the same with the other panelists, but what would you do if you were on this side of the table, if you were up here in this chair, what would you do to make sure that the ground water problem in the country could be resolved and we did not have these problems?

Mr. JOCHEM. I think one of the most important things, and it is such a very complex issue and it has taken me a good 12 years to gain a good appreciation of the entire issue, and certainly I think I have a long way to go before I could even be considered an expert, and I think activities like this help a great deal because it helps raise that awareness, both between our elected officials and the public at large. I think that is a very important first step.

Chairman TORRES. Mr. Jochem, I really appreciate your coming up here this morning. Being the first panelist, you really sort of set the stage for us, for the rest of the panelists to be able to talk about this and for my colleagues who are here and will read the testimony, I appreciate your coming in.

Thank you very much. You are now excused.

Mr. JOCHEM. My pleasure, Mr. Congressman.

Chairman TORRES. Before I table that panel, I will call the roll here. Ms. Marion Mlay, who is the Director of the Office of Ground Water Protection, U.S. Environmental Protection Agency.

Ms. MLAY. Yes, sir.

Chairman TORRES. Mr. Russell Wyer, the Director of the Hazardous Site Control Division, the Office of Emergency and Remedial Response, the EPA as well.

Mr. David Jones, the Director of the Superfund Remedial Branch, Hazardous Waste Management Division of EPA, Region 9, San Francisco.

Thank you all three for coming to our hearing this morning, especially the gentleman from San Francisco. He has come a long way.

Before we begin with your presentations, and Ms. Mlay is the lead off person here, let me make a statement for the record.

When I requested you to testify at this hearing, I specifically requested that you testify about national ground water issues, and I had also requested that someone, preferably from California, testify about the extent of the ground water contamination in the San Gabriel Valley.

I was displeased, to be sure, and want to put it in the record that the agency had decided, first of all, not to participate in the panel specifically devoted to the problems in the San Gabriel Valley. They did not do that.

Second, that you are here presenting testimony about the basinwide technical plan for the San Gabriel Valley.

This is not the topic that I asked the agency to address at this hearing, and I am more than a little displeased, if I can say that, that this was apparently not communicated to you before you prepared your testimony. Now, since I did not receive your testimony until 5 p.m. yesterday, there was no opportunity to communicate what I have just said to you, so I want to put that into the record at this point.

I would ask Ms. Mlay to give us your statement. Your statement will be entered in its entirety into the record, but I would like you to summarize, if at all possible, in order to allow for greater time for questions. Thank you.

TESTIMONY OF MARIAN MLAY, DIRECTOR, OFFICE OF GROUND WATER PROTECTION, OFFICE OF WATER, U.S. ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY RUSSELL H. WYER, DIRECTOR, HAZARDOUS SITE CONTROL DIVISION, OFFICE OF SOLID WASTE, EMERGENCY AND REMEDIAL RESPONSE, AND DAVID B. JONES, DIRECTOR, SUPERFUND REMEDIAL BRANCH, HAZARDOUS WASTE MANAGEMENT DIVISION, REGION 9 OFFICE

Ms. MLAY. Thank you. Good morning, Chairman Torres. I am very pleased to be here this morning.

As you pointed out, I am joined today by Russell Wyer and David Jones. Russ Wyer from the Headquarters Superfund Program and Mr. Jones from our Superfund Remedial Branch in San Francisco.

We are pleased to be here to discuss the Federal and State ground water protection activities, to review Superfund activities in the San Gabriel Superfund area, and we would be glad to answer your questions afterward.

Ground water protection, as you, I am sure, are very aware, poses significantly different problems in protection of surface water resources and air. Concentrations of contaminates released to ground water have much less opportunity to be diluted. Ground water is not very easily monitored. It is caused by discharges from a very wide variety of sources, and not just from large industries, but small businesses, farmers, and many individuals.

Many activities that are potential contamination sources have, as their principal protection, State and local government adjustments of land use practices, which makes the issue even more complex.

Until recently, as you pointed out, ground water was generally considered to be pristine. It is now known that there are many

sources, a variety of man made as well as natural contaminates that we are faced with.

We are, in a sense, in a fortunate position, although there are many areas that face the kind of serious problem that San Gabriel Valley does. We still have an opportunity to move at all levels of government to protect future ground water supplies.

We, at EPA, have a wide variety of ground water protection activities under our current statutes. They control and clean up the most serious sources and control the use of many chemicals including pesticides.

You mentioned some of our alphabet soup. It tends to be a very powerful set of alphabet soup in the sense that under the Safe Drinking Water Act we do set drinking water standards which are useful in dealing with ground water contamination. The Clean Water Act and Safe Drinking Water Act giving us authority to work with State and local government in developing their State and local programs. FIFRA, RCRA, CERCLA deal with very extensive problems of ground water contamination, in addition to other media.

EPA has established, under our Deputy Administrator, a ground water task force to look at these issues. There are representatives from all of the offices and the regions on that task force, and we are attempting to develop an agency-wide strategy for the actions EPA will take over the next 5 years to establish principles and objectives to guide our future efforts and establish more effective relationships with other Federal agencies who share in our end responsibilities for protecting this resource.

While we have a task force underway, we continue to make fairly significant progress in protection and restoration of ground water. Since 1984, we have based these ground water efforts on a ground water protection strategy which Administrator Reilly believes continues to serve as a strong framework for the future.

The task force is examining our experience on how we should move forward. But some of the basic principles established in that 1984 strategy are important to review.

First, we believe that State government has a critical role in protection of this resource as well as in the management of its use. The Federal Government certainly plays an important role as defined by our statutory mandates. But we view State efforts as crucial.

EPA has supported State ground water strategy development, and there are a number of related new efforts which have been recently passed by the Congress, such as the State Well Head Protection Programs, to help States focus their ground water protection activities on the high-risk areas of the resource; those areas which feed into public drinking water wells.

Second, decisions about how to manage the resource need to take into account the use, the value, and the vulnerability of the resource. This allows the agency to focus its resources and efforts on the areas where greatest risk to human health in the environment is presented.

Third, a Federal/State partnership effort should be structured so that ground water protection efforts are enhanced. To implement this, we will focus on assisting comprehensive State ground water

protection programs, pollution prevention, technological innovations where feasible, and financial and technical assistance for States so that they can develop appropriate land use policies.

We know that Superfund and RCRA corrective actions are expensive and very high relative to the cost of prevention. We believe EPA and the States should give greater emphasis to preventing ground water contamination.

To assure that ground water is protected, EPA must help States work with small businesses throughout the United States. Through our regulatory programs, we work with small businesses to assure input during the regulatory development and to assist them in understanding our requirements.

We also work with State agencies in the development of their ground water strategies to help them understand and appreciate the roles of small business and its problem.

With respect to the San Gabriel Valley, much of EPA's recent efforts have been focused on meeting the goal of containing the ground water contamination within the San Gabriel Basin by controlling the migration of contaminates through the Whittier Narrows Area and into the Central Basin to the south.

In July 1989, we completed preparation of a preliminary draft of the Whittier Narrows Operable Unit Feasibility Study, which identifies, develops, and evaluates potential remedial action alternatives to meet this goal. We have circulated that local report among interested State and local agencies for their review as well as provided copies to local community groups.

After consideration of the input we receive, we plan to release a revised version of the report along with EPA's proposed remedial action plan for the Whittier Narrows Area to the public as part of a formal public comment period. This is currently scheduled to occur before the end of this year.

The other major focus of our recent efforts is the development of a long-term management plan for the San Gabriel Basin. We have been working to prepare the San Gabriel Basinwide Technical Plan, a report that will outline a technical approach to remediation of the San Gabriel Valley's ground water contamination problem.

This approach will identify specific remedial investigation activities that should be conducted to support the identification and development of remedial action plans and proposed priorities for implementation of operable units in the San Gabriel Valley after the Whittier Narrows Operable Unit.

Finally, source investigation activities to support enforcement actions to implement proposed operable units to recover EPA's costs in the planning and implementation of the first three San Gabriel Valley operable units.

In developing the Basinwide Technical Plan, EPA has identified a key institutional issue that must also be resolved at the State and local level to successfully implement the plan. There is the need for a State or local agency to coordinate management of ground water in the basin from a water-quality perspective.

EPA's analysis of available data indicates that local ground water pumping is a significant factor in influencing regional ground water flows. Therefore, the successful control of migration of contamination within the basin will require the coordination of

local pumping by purveyors and artificial water recharge of surface water or reclaimed water with the extraction, treatment, and use of contaminated ground water outlined in the Operable Unit Remedial Action Plan.

EPA plans to use the release of the Basinwide Technical Plan as an opportunity to begin discussions with State and local agencies and the public concerning the issues outlined today and to work toward development of an overall Basin Management Plan that will describe how Federal, State, and local government will work together to solve this large and complex problem.

In the meantime, EPA will continue to implement appropriate remedial actions to the extent we can before an overall management plan is developed. Until the management plan is developed and implemented, however, EPA's implementation of the Basinwide Technical Plan will be greatly restricted for the reasons I have described.

EPA welcomes a discussion of any comments and concerns that will help us in our management of the San Gabriel sites.

Solutions to the problems associated with ground water will not be easy. As I have said, EPA has a new ground water task force as well as continuing efforts under our current statutory authorities. Based on the efforts of the task force, we will look at the Federal role in ground water protection as well as whether we need to change our current statutory authorities.

Mr. Chairman, this concludes my testimony. I would be pleased to answer any questions from you or members of the subcommittee who join us.

[Ms. Mlay's statement may be found in the appendix.]

Chairman TORRES. Thank you, Ms. Mlay, for a very concise testimony and report on EPA's activities. I have read it with interest. As I said, late yesterday, the committee and I attempted to digest this.

There is something I would like to raise with you at this time.

As you know, in June of this year, this subcommittee traveled to the San Gabriel Valley and involved itself in the first set of hearings actually there in the valley.

We had at that time Mr. Jeff Zelekson, who is the EPA's management person up there. Mr. Zelekson, in his testimony, as we have it here in the report of the hearings, did tell us, as I understand it, that this cleanup, the cleanup that we are talking about, means that projects could only go forward, as he has put it, "if responsible parties who can pay for the cleanup have been identified." This was one of the big conditions of cleanup.

From reading your testimony, as you have just presented it to me, it seems that what you are now saying is that if, and you said this essentially on page 10 and 11—you might look at that—you said that if some sort of super water management agency—you are saying that here really, if I can state it;

> In developing the Basin Technical Plan, EPA has identified a key institutional issue that must also be resolved at the State and local level to successfully implement the plan. This issue is the need for a single State or local agency to coordinate management of ground water in the basin from a water quality perspective.

For lack of a better word, a kind of water czar or something out there? So, it will not matter if we find out who is responsible.

Projects, as you indicate, will not be implementable. Can you explain specifically what all this means?

Ms. MLAY. I would like my colleagues from the Superfund Program to discuss that particular point with you. I think we are looking for—I don't know that czars are necessarily coordinated. They usually were running everything. We are looking for someone here who can bring people together and can make sure that the various portions of a management plan are, in fact, taking place through either one or several organizations.

So, if I might ask Mr. Jones to answer.

Chairman TORRES. Please, Mr. Jones. Enlighten us.

Mr. JONES. There are certain things we can do, but let us take Baldwin Park as an example.

Chairman TORRES. All right.

Mr. JONES. Pretend we had finished that operable unit now, we had issued a record of decision. We are looking to the future. But pretend that decision was in our hands today.

That solution would look something like this. We will have to start pumping from some wells that are contaminated, that have been shut down. We will have to treat that ground water. We will have to find somebody to treat it. We will have to find a distribution system that is willing and able to take it. We will have to find a water purveyor or somebody to operate that system. We would probably have to shut down some existing wells in some immediate areas. We probably would say there must be a moratorium area or a zone where there could be no new wells within so many square miles so that that remedial action was not countered by something else.

Those types of actions would be probably what would happen in a typical Baldwin Park solution.

I went through 208 planning in region 9 and noticed that a lot of plans went on bookshelves because there was no institutional capability, even when you had a good, thought out, technically correct plan. So, my concern is, whether we fund it ourselves or if we had responsible parties in Baldwin Park fund it, either way, until we have somebody with authority to prohibit wells from going certain places, make people take treated water, make sure it is delivered—even if we had a responsible party today, and we said, "Could you build it?" the responsible party would turn to us and say, "It cannot be done institutionally."

So, the next 2 years or 3 years, while we are working on Baldwin Park, and in the Aerojet area—where we want to put our next operable unit—I am hoping that simultaneously with our effort institutions will be getting together so that when we do have technically good solutions available, they are institutionally possible to implement.

One compliment I would like to give you is to thank you for the leadership forum and the things you are doing to get local elected officials to talk about this. Because it is the local and State people who are going to have to come up with some institutional framework so that anything we come up with is conceivable and institutionally able to be implemented.

I think you are starting that process or have helped start that process, getting the locals talking to each other, so that when solu-

tions come up, either by us, through the fund, or responsible parties, they can be done.

Chairman TORRES. Why is it that in talking about an institutional device, why cannot the Watermasters at this time carry this out?

Mr. JONES. I think the Watermasters would need more authority because it is a creation of the court. The authorities it has today have been agreed upon by the parties. I do not know if it has the planning function or the ability to, except through consensus, stop somebody from drilling a well, or require somebody to take treated water. Those are things that perhaps, if they can do it through consensus, the Watermaster would be the person to do that. It may be that with MWD, the regional board, the State board, the Department of Health Services, there is an institutional framework through a joint powers agreement as an enhancement of the Watermaster.

From my EPA perspective, I am sure it is going to be difficult to do, but I know it is the locals and the States who are going to have to do this and not us. They know their legal authority. They know their institutional framework, and I am hoping that they can come up with a context which we could then plug our remedial action into.

Chairman TORRES. Why will this not affect the two on-line operable units that we now have? The Bartello and the Whittier Narrows?

Mr. JONES. The Suburban Unit is one in which the water that would be pumped will be used by Suburban. Since that water district is big enough, they would be the only party to receive all that water.

It is also an area where the wellfield is adjacent so that they can get that water without needing institutional agreements. If you start going in Baldwin Park, areas that have multiple purveyors, whose pumping patterns would be altered, maybe even altered different than the resource allocation they have, many more institutional arrangements would have to be made.

Clearly, a wellhead treatment system like we did in the Suburban plant that we built, since it was for the capacity that that water district already had at their facility, all these institutional arrangements did not have to take place for the particular sites we picked. I think when you start talking about managing the whole basin in a very efficient manner, we will need those institutional arrangements, especially, I think, in the Baldwin Park area.

Chairman TORRES. Before I continue subsequent questions, I would like at this time to acknowledge the presence of my colleague from Illinois, Mr. Glen Poshard, who has just joined us.

Mr. Poshard, we have gone through some excellent testimony here and presentations on the problem of ground water and how it is impacting not only the San Gabriel Valley, my area, but also the United States as well. We will get into some of those questions from a national perspective.

I have just returned from a similar hearing like this in Southern Illinois where the subcommittee studied the question of clean coal-burning technologies and some of the problems that Southern Illinois is beset with, especially as the mining area there produces

high-sulfur content coal and the aftermath of that in terms of producing acid rain.

I have asked Mr. Poshard, in passing through Southern Illinois, if they had ground water problems, and he indicated that they have some.

Mr. Poshard, if you would care, at this time, to make a statement relative to the subject matter here today.

Mr. POSHARD. Thank you, Mr. Chairman. Forgive me for being so late. I had another committee meeting and a delegation of State legislatures visiting here from Illinois, and I could not get away earlier.

Mr. Chairman, may I also expand a little bit here and include another area outside of ground water contamination and just see if these folks can help me.

Chairman TORRES. This is the time, Mr. Poshard, to nail them down.

Mr. POSHARD. Thank you, Mr. Chairman. I have a Superfund cleanup site in the county in which I live. It is the Crab Orchard National Refuge Wildlife Superfund Site, which EPA has just filed a report regarding proposed procedures for cleanup of PCB's and heavy metals that were left there over several years from ammunition manufacturers. The major method recommended for cleanup is incineration.

Can you folks provide me with additional information on this issue? We are in the midst of a tremendous public outcry in our area, not understanding, not knowing, about the safety of the incineration processes. Now, that is one part of the problem.

The other part of the problem is that this is a National Wildlife Refuge, and with the PCB's and so on having gotten into the Crab Orchard Lake, which is in the refuge, we are very concerned about underground water contamination of PCB's.

I would like to know to what extent those have been monitored and whether or not we found any contamination at that specific site. Any information you can provide me in a rather rapid fashion concerning this particular site, I would appreciate being informed.

But can you elaborate at this point on the overall success or failure of the incineration process and how that is worked out in other Superfund sites around the country? Can any of you speak to that?

Mr. WYER. My name is Russ Wyer. I will try to speak to it in very broad terms.

I am aware of the Crab Orchard site, and I have read the proposed plan.

Mr. POSHARD. Would you move the microphone closer to you.

Mr. WYER. I have read the proposed plan, so, I am aware that they do plan to incinerate the PCB's and then also chemically fix the metals and some of the ash coming out of the incinerator.

The important thing on incineration and certainly for PCB's, EPA has a requirement that it must meet what we call six nines. In other words, it must destroy the material to 99.9999. It is a very, very rigid requirement.

Even though that is the rule that requires that, the operation of the facility itself must be carefully monitored, and there are controls that are set in on these devices to do that. Again, the emissions—when you are burning a combination of metals with PCB's,

you are going to be very careful that you are able to extract out the metals to make sure they do not go up the stack.

We have used incineration. In fact, actually the provisions of SARA, our Superfund Act, requires us to go to higher levels of technology and to destroy, completely destroy, these substances, if possible.

So, I think from a general point of view, the proposal for incineration and fixation of the metals is the proper one and very consistent with the legislation.

Now, as far as other details on that particular site with regards to the lake, the ground water, it is my understanding that studies are still underway.

What I would propose is that we could provide written comment to you for the record to any questions you might have.

Mr. POSHARD. Mr. Chairman, may I ask another couple of questions on this?

Have you shown success at other sites in separating the metals out from the PCB's before incineration takes place? I mean is that a fairly safe process? That is one of the concerns that people have that you cannot do that sufficiently well as to ensure that the metals will not be burned in the process and thus create noxious kinds of pollutants in the air.

Mr. WYER. Yes; my difficulty in responding to that is I am not familiar with the levels that we are talking about. Some metals intermixed with organics are impossible to incinerate. If you get very, very high levels, then it may not be. Again, I do not have that level of detail on that site.

But, in general, if you talk about separating on other sites or other types of problems, separating out metals from organics, it can be complicated. It takes two different types of treatment trains. It is very, very site specific.

Mr. POSHARD. Is this an onsite incinerator that is being proposed, do you know? Are there any cases where you have incinerated but had the incinerator in some other location?

I ask this for this reason. The Crab Orchard National Wildlife Refuge is one of the largest revenue producers in the country, especially in our area, because people come there. We have huge flocks of Canadian geese that winter there. It is a big tourist attraction. We have all kinds of deer. It is one of the more popular recreational and tourism sites in the midwest, and we are afraid that having this incinerator belching what may be very safe kinds of smoke or whatever, but the public may misunderstand that, and it might cut down on what has proven to be a great natural attraction for our area. Thus, cut down on sales and tax revenues generated from the hundreds of thousands of people who visit and that sort of thing.

That is a real issue of concern to the business community in our area. Is that a concern of EPA's?

Mr. WYER. I believe that the proposed plan suggested the incineration be done on site. But, again, looking at it on a broader scale, that is an issue that I think most local communities are very concerned about, should we have the incinerator here in our own backyard? Should we haul the material to some commercial facility? Or should it be constructed down the road?

I think that what we have found is, in our solutions, it varies from place to place. But from the standpoint of having confidence in the system and being able to work, it can work just as well on site as it can at an industrial facility 2 miles down the road. It is, I think, the agency meeting with the community, people like yourself, understanding technically what the controls are, what the threats might be. I assure you, if it was belching smoke, it is not running right.

Mr. POSHARD. I have never seen an incineration in operation, so I do not know.

Mr. WYER. It is a matter of explaining to them what the safeguards are.

Mr. POSHARD. Thank you. Thank you, Mr. Chairman.

Chairman TORRES. Thank you, Mr. Poshard, for your excellent questions.

I would like to ask Mr. Ted Smoots, the minority counsel, who is representing Mr. Hiler of Indiana, of course, because he is in the proximity to Mr. Poshard's area in Illinois, if he has any questions?

Mr. SMOOTS. Thank you. Not right now, but Mr. Hiler may have some questions later in writing to put in the record, if that's all right.

Chairman TORRES. Without objection, we will take those. Thank you, Mr. Smoots.

Thank you again, Mr. Poshard, for joining us this morning. It is very important for us to get at these questions.

Let me ask Ms. Mlay again here, under the Safe Drinking Water Act, the agency sets standards for what is considered safe water at the tap. Under the Clean Water Act, the agency is directed to prevent discharge into the surface water that could cause any level of contamination.

Is there any legislation directing the agency to prevent ground water contamination as such?

Ms. MLAY. Not per se; no. There are a number of statutes which require us to control certain sources of contamination, the RCRA underground storage tanks. Sources are controlled through various statutes.

There is a provision in the Clean Water Act which talks about helping State and local government plan and develop programs for protection. In the Safe Drinking Water Act we have a new statute, the Wellhead Protection Program, which requires States to develop particular protection after it is around public water wells. But there is not a generic statute with respect to ground water.

Chairman TORRES. Do you see a need for this type of legislation, generic as such?

Ms. MLAY. I think I have the same response as Mr. Jochem does. I think there is sufficient authority within the Federal statutes to provide considerable protection if one assumes that State and local government have a major responsibility.

We have concerns, of course, that many of the ground water protection actions, especially as you can see in the San Gabriel Valley, have to do with how local government is run, how land use decisions and water allocation decisions are made. We feel those are very much State and local issues and our role is to help them carry those functions out but perhaps not take them over.

Chairman TORRES. You mentioned in your testimony the Ground Water Task Force, am I correct?

Ms. MLAY. Yes.

Chairman TORRES. How and by whom was it set up, and what exactly is its charge?

Ms. MLAY. It was set up by Administrator Reilly in late summer under the chairmanship of our Deputy Administrator, Hank Habick. It includes people at the Assistant Administrator, Deputy Assistant Administrator, Office Directors, and senior levels in the agency, including rather heavy representation from our regional offices.

We are looking at the history of our efforts to assist States. We are looking at Federal and State relationships as a major issue. We have recently gotten a draft report and held a forum with State governments at the urban institute, which is a think tank here in town that does work of that sort, and has looked at our support of State ground water strategies. Over time, we are looking at the findings of that report. We are looking at questions of data management and research in ground water. Looking at questions around sources of contamination and whether——

Chairman TORRES. This is the task force?

Ms. MLAY. Yes; including myself. We are looking at a variety of issues that I think are important with respect to increasing the ability of Federal, State, and local government to protect and to deal with this very complicated resource. We are hoping that we will have some thoughts to share late this year, early next year, and have an opportunity to meet with interested Members of Congress, with various groups, with the public, and begin a dialogue on what types of additional steps EPA or other Federal agencies should be taking.

I think it is an extremely important issue and one deserving of some pretty thoughtful consideration.

Chairman TORRES. You mentioned late this year, possibly next year, of having completed enough analysis to make some recommendations. Do you think that if the committee asked you to come back, well, let us say, 6 weeks or 2 months later, would you have something to report then?

Ms. MLAY. We should, yes.

Chairman TORRES. Good.

Ms. MLAY. Probably after the holidays.

Chairman TORRES. Mr. Poshard.

Mr. POSHARD. Yes; thank you, Mr. Chairman.

You may have asked this question before I came, and if you did, then I apologize, and I will simply go over the transcript.

Do we have any evidence at this point, or are we studying through EPA the effects of chemical or other kinds of fertilizer on farm crops and so on, the effect that these chemicals may have upon underground water contamination?

Ms. MLAY. There is considerable work going on in the Department of Agriculture of which we are a part. Also with the U.S. Geologic Survey. There is something called the Mid Continent Study which is a joint effort by Agriculture, U.S. Geologic Survey, and ourselves to get a much better sense of that. There is a Presidential Water Quality Initiative which includes particularly re-

search on the effects of agricultural practices on ground water. I think there is about a total of $40 million that has been allocated—an additional $40 million—for this current fiscal year of which the Department of Agriculture has the substantial portion, much of that looking at research in that very area.

Mr. POSHARD. No preliminary results at this point?

Ms. MLAY. We are waiting for the money to start it.

Mr. POSHARD. The study is underway but it actually——

Ms. MLAY. There has been work going on on the issue, but it is a very difficult one as your question implies.

Mr. POSHARD. Thank you.

Chairman TORRES. Ms. Mlay, Mr. Jones, and Mr. Wyer, we are very appreciative of your coming this morning and making your presentation, clearing up some areas of concern for us, and the good prospect that we may hear from the task force early in the year. You are now excused. Thank you.

Ms. MLAY. Thank you.

Mr. JONES. Thank you.

Mr. WYER. Thank you.

Chairman TORRES. We will now invite our third and final panel to the table. Mr. Erik Olson, representing the National Wildlife Federation; Ms. Velma Smith, of the Environmental Policy Institute; and Mr. Roger Strelow.

Is that correct? Is Mr. Strelow with us?

Ms. SMITH. No.

Chairman TORRES. No; he is not with us this morning. But he will submit, as I understand, his testimony in writing.

Again, we welcome the two of you. We have met in the past. I commend you for your good work.

You have heard some comments this morning from our private sector and governmental sector representatives. We would like now to hear from the field of advocacy here on environmental issues.

As I have stated to the other witnesses, or testimony presenters, your entire testimony will be printed in the record, and it will appear as such. You may wish to summarize and add any exhibits you may have.

We will hear first from Mr. Olson.

TESTIMONY OF ERIK D. OLSON, COUNSEL, ENVIRONMENTAL QUALITY DIVISION, NATIONAL WILDLIFE FEDERATION

Mr. OLSON. Thank you, Mr. Chairman. I am Erik Olson, and I am counsel for the Environmental Quality Division at National Wildlife Federation. We are the largest environmental organization in the country with about 5.8 million members and supporters nationally.

We commend the subcommittee for holding these hearings on this important issue. It is important not just to small business, obviously, but to all Americans. The public's interest in this issue is growing.

You have mentioned earlier in this hearing that it was your sense that there is growing interest in this issue, and I have noted in my written testimony several public opinion polls that have

been taken over the last several years which have documented this growing interest.

For example, in 1988, 84 percent of the American public was very concerned about fresh water pollution, 63 percent thought toxic waste problems were getting worse, and 70 percent thought that the Government was doing too little about solid waste.

In addition, in 1988, 55 percent of the American public thought that most underground drinking water sources were polluted or that as many underground sources of water were contaminated as were uncontaminated. That is an amazing growth just since 1981 when it was as low as 28 percent of the public that thought that. So, it jumped almost 30 percent in just a matter of years.

Similarly, a 1987 poll of our own large membership found that drinking water quality was the singlemost important issue to our members. Thus the public concern is clearly growing.

We urge the subcommittee to recognize that while further education and research is clearly needed, multiyear research programs should not be used as an excuse to avoid some comprehensive legislation that would address the problems of today.

Really, there has only been one piece of legislation introduced in Congress that would address the problems, and that was legislation introduced in the last session of Congress by several Senators, members of the Senate Environment Committee, which has not been reintroduced this year.

As this Nation ignores what you called the "out of sight, out of mind" problem, millions of individual pollution sources ranging from enormous, leaking, industrial lagoons, to improperly operated septic tanks in backyards continue to leak their poisons. They pollute underground sources of drinking water, which is the lifeblood of many sensitive aquatic ecosystems and, indeed, is used by many of us for drinking water.

It is impossible to know exactly how many small businesses ranging from roadside restaurants to motels and stores have had their drinking water supplies contaminated or rendered unsafe from contamination by ground water pollution.

According to EPA, over 50,000 people have been reported ill in public health records from 1971 through 1985 from drinking contaminated ground water. Indeed, many experts think that the number is more like 25 times that number.

Chairman TORRES. You have given the initial number? What was that?

Mr. OLSON. It was over 50,000 people.

Chairman TORRES. Over 50,000.

Mr. OLSON. The costs of these illnesses, simply in terms of lost productivity, not to mention human suffering, are staggering. Few, if any, businesses can survive for long without an adequate supply of safe water for their employees and customers.

Moreover, the costs of cleaning up polluted ground water to assure protection of public health in the environment potentially could destroy the livelihood of many small companies and, indeed, large companies.

Numerous small businesses have learned the hard way that ground water pollution cleanup can cost them hundreds of thousands or millions of dollars. Even the cost of simply drilling a new

well can be several thousand dollars. Undoubtedly, some small businesses have gone bankrupt due to the extremely high costs of ground water cleanup. The costs of taking preventative measures to avoid this pollution, while perhaps initially seeming painful to some businesses, simply are a fraction of the costs of cleanup. The old adage that a penny of prevention is worth a pound of cure was never so apt as it is in discussing ground water pollution.

Experience shows that cleaning up polluted aquifers is extremely expensive. The average Superfund site now costs $21 million to $30 million to cleanup, and some cost $100 million, or, as I have noted in a footnote, it is estimated that cleanup at one site will cost $2 billion to clean up.

Obviously, small businesses are not going to be able to foot the bill if they are contributors to a major site like that. Moreover, the cost to the taxpayers of ground water cleanup are awe inspiring. GAO has documented that total cleanup and upgrading costs at DOE facilities alone will be as much as $155 billion.

But this national ground water debt at Federal facilities and Superfund sites is only the tip of the iceberg. In addition to hazardous waste disposal at these sites, there are literally hundreds of thousands, perhaps millions, of sites of ground water contamination. You have noted the San Gabriel Valley. There are many other sites very much like that where there is broad contamination from business facility leaks and spills, hazardous substance stockpiles, sewage treatment plants, oil and gas, refining waste, agricultural application of pesticides, and so forth. For this reason, we must start to prevent contamination today rather than trying to clean up the Augean stables that we have created, sometime tomorrow.

Thus, the only rational approach is to prevent ground water contamination through comprehensive, minimum, national ground water protection requirements.

I just wanted to note briefly how large a problem this is nationally and what kind of health impacts have been documented.

The U.S. Geological Survey [USGS], released a document in 1988 documenting that there is ground water contamination in every State in the United States. As a matter of fact, these contamination problems stem from a broad array of contamination sources such as hazardous waste dumps, industrial municipal landfills, hazardous materials storage, transfer, underground injection wells, fertilizer and pesticides, animal husbandry, and so forth. Many, in fact probably most, of these sources are currently unregulated at the Federal level.

No comprehensive national ground water pollution monitoring program exists. But we do know from the monitoring that does go on, that the alarm bells are ringing.

For example, USGS tests of 120,000 wells nationally found that over 7,900 of those wells exceeded the nitrate standards for drinking water. An additional 16,300 wells had elevated levels of nitrate that were approaching the drinking water standard. That is over 24,000 wells.

Nitrate contamination can cause infants to lose their ability to absorb oxygen-causing blue baby syndrome and may cause other health effects. It has been linked to improper fertilizer use and human and animal waste, and it has been found to exceed EPA's

health standards in 48 States. In several States surveyed by USGS and State agencies, the drinking water standards were exceeded by one in four wells with nitrates.

Similarly, EPA has found massive contamination from pesticides in many States and, as you know, in the State of California, which perhaps has the best pesticide monitoring network in the country, contamination has been found in one in four of the 8,300 wells that were tested by the State.

Industrial and chemical waste contamination has closed thousands of wells. In New Jersey alone, according to one estimate, 5,000 wells were closed due to ground water pollution.

I have attached an appendix which lists many of the sources of contamination in the State of California.

In some States, 30 to 50 percent of the wells are contaminated with unsafe levels of bacteria. The list goes on. As we gather more data, it is becoming increasingly clear that contamination by ground water by industrial, agricultural and other sources, is quite serious and widespread.

Ground water pollution has now emerged as a public health and environmental issue of the first magnitude. In addition to those 52,000 illnesses that I mentioned, there is also documentation of some deaths that have resulted from ground water contamination, including one recent death in the State of South Dakota due to nitrate contamination. A small baby died because her infant formula was made with very high levels of nitrates from ground water.

The number of chronic illnesses and latent diseases, such as cancer, caused by ground water pollution has yet to be determined on the national level. However, two recent studies suggest that these subtle and insidious effects may be far more widespread than we once believed. For example, a national study that was just released this year, conducted by EPA and academic scientists, found significant associations between certain forms of cancer, such as bladder cancer, stomach and intestinal cancer, and counties where there were hazardous waste sites that had contaminated ground water.

In the State of California, another study just released this year found that pregnant women who drink tap water pumped from ground water had the greatest risk of having spontaneous abortions compared with pregnant women drinking bottled water. The specific toxics that might have been responsible for those abortions had not been yet identified.

Although there are no good national data on the number of such cancers, spontaneous abortions, birth defects, and chronic health problems from ground water poilution, we do know that ground water in every State is polluted with a cornucopia of organic and inorganic pollutants.

I will let my written testimony stand for the rest of the statement. But I would like to conclude by just saying that we believe there is no justification for waiting for yet another decade or many more years to begin to require protective measures to prevent ground water contamination. Without preventive action, we will have a legacy of scarce polluted ground water that may be forever impossible to clean up or use which will be the bequest to our

heirs. We know enough to act now. Let us not miss that opportunity.

[Mr. Olson's statement, with attachment, may be found in the appendix.]

Chairman TORRES. Thank you, Mr. Olson, for a very excellent testimony. Let me also add my gratitude and that of the subcommittee for an excellent array of documents and comprehensive collection of materials that you have made available as part of your testimony. That will serve the subcommittee well.

Now we would like to hear from Ms. Smith. Please.

TESTIMONY OF VELMA M. SMITH, DIRECTOR, GROUND WATER PROTECTION PROJECT, ENVIRONMENTAL POLICY INSTITUTE/ FRIENDS OF THE EARTH

Ms. SMITH. Thank you, Mr. Chairman.

On behalf of Environmental Policy Institute and our new partners in environmental advocacy, Friends of the Earth, I certainly want to express my appreciation for this opportunity, and also for your interest, and the interest of the subcommittee members.

I would particularly like to commend you, Mr. Chairman, because not only have you shown that you have a great interest in trying to solve your community's problem, and get to the bottom of that, and help your citizens, but also you are interested in helping assure that kind of situation does not get repeated across the country. That is a broad vision that certainly we need.

Chairman TORRES. Thank you.

Ms. SMITH. I have submitted a written statement which has a lengthy footnoted discussion on the status of ground water resources, and I certainly am not going to take time this morning to belabor those statistics.

Chairman TORRES. As you know, your testimony will be entered in its entirety and will be printed that way.

Ms. SMITH. Thank you, Mr. Chairman.

I simply would note the availability of that material for your reference, and there is considerable information, particularly, on Mr. Poshard's question with regard to nitrates. Certainly, we have the opportunity to provide more information for members.

But I would like to simply draw from that the undeniable conclusion that the ground water pollution problem is a problem of significant national proportion.

As you continue these deliberations, I think that it is clear that you are going to hear from those including, if you look back, the past administration and to some extent this administration, who will say that we still face basically a local problem.

I think somehow responding to this problem of ground water contamination by saying, "it is a local problem and that is how we will deal with it" is something akin to saying that illiteracy is a personal problem. It is just not very constructive.

I think that all ground water problems are indeed local problems, but they are also local problems with significant national ramifications, and I think that we concluded, as Mr. Olson has said, that it is time for some Federal action.

In other committees of Congress, I know members are looking at several options for research legislation, and some of the proposals that are out are indeed useful. But while there is much we can learn from ground water research, we want to stress that we do not need to wait for the results of research to take some actions that will better protect ground water now.

We do not need to wait for research to know that storage of liquid fertilizers in unlined pits can and has caused ground water contamination. We do not need to wait for research to know that septic systems have to be located in the proper settings, and that they must be pumped out periodically to continue functioning.

We know that chemigation, without the protection of back-flow prevention devices, is not sound practice. We know that the injection of waste materials underground directly through the annulus space of a well is basically a bad idea.

We do not need research to tell us that the application of fertilizers without appropriate soil testing may result in the overuse of chemicals. That industrial operations that have floor drains connected to shallow discharge wells may be pumping harmful chemicals directly into drinking water sources.

We know those things now. I believe that we have some ability to act on those things now. So, if ground water research is one part of a national ground water program with other program elements at the same time serving to initiate new regulatory programs and expanding current regulatory efforts, then ground water research is a good idea, a step in the right direction. But if research legislation becomes a rationale for delay, or the reason to push ground water problems to the congressional back burner for a few more years, then we think it is a grave mistake.

What we would urge members of this subcommittee to do is not to fall into the trap of thinking solely of research, but to think of research priorities as part of that overall program; a program for which I would like to outline some basic principles.

The framework which I would offer this morning is one which is supported by a whole host of environmental groups including the National Wildlife Federation, here with me this morning. One which we hope that you will scrutinize, look over, improve, and use in your deliberations.

Along those lines, we believe that we must recognize that ground water is not going to be protected by programs that merely respond to contamination after the fact. As Erik outlined, there is a widespread agreement and painfully clear evidence, as you know, Mr. Chairman, that ground water cleanup is technically difficult and very, very expensive.

So, borrowing from the Clean Water Act, we would call for Congress to adopt a national goal, which we do not have, to protect and enhance the physical, chemical, and biological integrity of the Nation's ground water resources.

Now, adoption of that goal is not going to create an automatic end to all ground water pollution discharges. We understand that. But it would guide Federal and State policies with a determination that no avoidable pollution is really acceptable. It would set a basis for programs to protect the ground water resource, not just predicted uses of the resource.

We also believe that the ultimate answers to ground water protection cannot ignore the connections of ground water to surface water and the interrelationship of other environmental media with ground water.

Mr. Poshard asked the question about a Superfund site. That is not exactly a ground water question. It was not. But it is relevant, since we are trying to cope with how do we deal with all the waste that we have created and the problems that we have created. We think in order to solve the ground water problem, we have to seek the Federal program that will stop the national pollution shell game and really seriously promote waste reduction and improved chemical efficiency across the board.

I have with me—and I do not have copies for the committee—but on the whole issue of ground water connections to surface water, the September issue of Scientific American has a pretty compelling picture. We tend to forget the connection to surface water of ground water. But this picture is of a creek in Oklahoma that is black with oil—the entire creek area. This creek was polluted from an oil well. It was not a spill running across the surface. It was an oil well. So, they are connected—ground water and surface water. I think that is something important for committee members to keep in mind.

Further, I think we cannot make the mistake of waiting to control ground water discharges until we develop a full and unassailable toxicological profile for the tens of thousands of chemicals that we have in use. We cannot let standard setting set the pace for pollution control.

I think if you take a look at our experience with standard setting, data gathering, risk assessment, on a chemical-by-chemical basis, with the Federal insecticide law, with the Safe Drinking Water Act, with TSCA, with any of that alphabet soup of laws, you find we know that the approach of doing that is less than expeditious, and it is really fraught with problems of uncertainty.

So, numerical water quality standards cannot serve us effectively if we use them as the sole basis for action or as a Government-sanctioned license to pollute. We believe that the first line of defense in ground water legislation should be source controls, not water quality standards.

We believe that effective ground water protection throughout the Nation is going to occur only when the Federal Government acts to adopt a national program of source controls to minimize or eliminate discharges of pollutants and toxic chemicals to ground water. Minimum Federal standards of care and control for categories of sources and activities which have the potential to pollute ground water are needed.

The source control approach comes to us from the Clean Water Act in the form of technology-based controls on waste water discharges that are established at the Federal level and applied uniformly to various categories of facilities nationwide. It is one which we think can work for ground water. With the caveat that we cannot think only of putting on technology applications—not just think of the black box that is going to remove the zinc or the arsenic or whatever, but think of standards of care, housekeeping

practices, best management practices. We must think more broadly than technology.

We think that is where any ground water protection scheme is going to eventually have to arrive, in controlling discharges. We think that such an approach would provide for equitable treatment of all polluting sources, guard against economic blackmail in individual States and communities, and reward environmentally sound activities by requiring uniform results across economic sectors.

We also believe that effective ground water protection programs must be comprehensive. We cannot just pick out the easy targets of big industrial facilities and say, "Now we have done it." We have really got to go after the whole diversity of sources.

We also believe that a Federal ground water protection program must provide for fair and equitable treatment of all citizens regardless of their place of residence. Just as citizens of particular States should not be denied minimum national protections, we do not think the citizens in, say, rural areas, should be discriminated against through a program that ignores the needs of private or small water system users.

I bring this up because it is something we have great fear of where the EPA ground water strategy and the classification guidelines are taking us. In looking at those, we find that EPA appears to say, "We cannot do everything, so we will just protect the largest communities." That is where we are headed with EPA's strategy.

Earlier today, Mr. Chairman, you asked, if you were sitting on that side of the table, what would you do. I think this may be one of the more important actions that Congress could take. I think that Congress needs to speak out about fairness on this issue, not only for rural versus urban areas, protecting small communities, but for protecting people in a whole variety of geographic areas.

We cannot have a ground water classification strategy that allows us to write off areas such as your area which are already contaminated. Yet, if you look at the strategy and look at the classification guidelines, that may be where we are headed with the EPA strategy. So, I think this is an important area for this committee to consider.

A new national ground water law must also reject the notion that the ground water resource lends itself to the kind of control programs that are based on predictions of an assimilative capacity or calculations of acceptable pollutant loadings. We think that our aim has to be to protect the full resource and not just degrade selected segments of it.

I think we heard earlier, and certainly your experience has shown in your community, Mr. Chairman, that we do not always do the best job in predicting what is going to happen with pollutants in ground water. Predictions were made on what was a confined aquifer in that case, but it turns out that the aquifer is more of an unconfined aquifer.

But those terms are relative. They are not black and white. They are relative terms. Permeability; permeable zones versus impermeable zones. Those are again relative factors, but we treat them as if they were black and white.

Ground water presents us with a multidimensional problem, and you have to look at where the ground water contaminates are flowing, what the lateral flow is, what the vertical flow is. You have to look over time as well, and I think the experience with cleanup in the San Gabriel Valley, from what I hear this morning, also tells you that you have to think about what the pumping conditions are.

So, you make these grand predictions, and even if you are right about your predictions of how permeable or impermeable, confined or unconfined, an aquifer is, if pumping conditions change, ground water flow and contaminate flow may change as well. You may find yourself with an entirely different problem.

Finally, I think we have to set aside the notion that the States are going to succeed in ground water protection without significant Federal involvement. I know that this is a particularly difficult issue. But we believe that the role of Federal Government with regard to ground water just has to be one similar to the widely accepted role in other resource protection areas.

If we are going to develop and implement ground water programs that have some hope of being effective, for citizens from Minnesota to Mississippi, in lessening the likelihood of pollution havens in economically depressed areas, and of leaving future generations with a clean water supply, then we have to place the Federal Government in a leadership role. We believe there has to be a Federal gorilla in the closet. I am going to close.

Actually I would like to venture a few observations about ground water contamination problems in the small business community, because undoubtedly members of this committee would have a special sensitivity to the needs of small business and an interest in promoting opportunities for people to enter small business, to protect the economic viabilities of small businesses. That is your job on this committee.

In looking after small business, when it comes to ground water, some members may find themselves primarily worrying about the potential adverse impact of new regulatory programs on small business. No doubt you need to examine those questions.

But I would argue that small businesses are really on two sides of the issue. Not only as the polluter who must make adjustments in order to better protect ground water, but also the victim of pollution. For small businesses, like the rest of us, rely on water, and without access to clean water, their very survival may be threatened.

I think we tend to concentrate, as I said, on ground water problems only as problems with drinking water. In some ways that is good, because of the personal tragedy that a household may have when they are faced with contaminated water. But that focus also tends to underestimate the scope of the problem.

A couple of examples just from phone calls that we have had. One from a community in New York where citizens were finding literally home by home that their wells were tapping into methane. People having to move out of their homes with explosive levels of methane. They could drink the water, but a fellow called me—he walks into the kitchen and lights a cigarette and finds that he's got an explosion in his kitchen. That community had small businesses

who were going out of business because they were faced with this problem.

A phone call from a New Jersey community that had a host of organics including benzene and basically other gasoline additives. There you had restaurants and motels who did not know what to do. Bottled water would not help a restaurant or a motel.

One phone call, from Alabama, perhaps best shows that small businesses are indeed on both sides of this problem. That was a phone call that I had from a rural general store owner in a community in Alabama. He had replaced the gas tanks, at some expense, at his little store. He was not crazy about having to do that, but he says, "Look, I am a law-abiding citizen. I am willing to do my part." But at home what had happened to him was that a neighbor had an unlined pit with liquid fertilizers. Indeed, there were several of these unlined pits unregulated by the State in the area, and this gentleman has not been able to use his water for about 8 months now. Not only his drinking water, but also, he cannot wash clothes. They have to go to the local laundromat.

He is very angry that he had done his part at his store but that another operator of business had not done his part.

So, to close, I think that clearly our old cartoon character, Pogo, was right. The enemy on ground water is us. It is all of us. We are all potential victims of contamination. The solutions are going to demand something of all of us, but clearly we think it will be worthwhile. Thank you.

[Ms. Smith's statement may be found in the appendix.]

Chairman TORRES. Thank you. Thank you, Ms. Smith, for excellent testimony.

Indeed, I am going to ask Mr. Poshard if he has any questions. He may have to leave, and I want to give him the first shot at this.

Mr. POSHARD. Thank you, Mr. Chairman. I appreciate the testimony. I do have to leave. I have some constituents waiting, but let me ask a couple of questions. I am not sure which of you to ask. The local versus Federal control issues seems to be paramount in the minds of many people. What do we do about that? You are obviously not satisfied with the Federal commitment at this point in time. We need the gorilla in the closet, as you say.

Yet the local and State agencies that have a responsibility for following through on controlling dumping and the sources of pollution and so on, they come under so often the influence of the local business community or the local industrial community because no one wants to lose jobs. We are in an internationally competitive market arena today that we have not had to experience in the past. We do not monopolize industry and business the way we used to. Many areas of the country have lost their industrial base and gone to a basic service industry base. Lower paying jobs. Less quality of life. So, jobs are paramount in the minds of many, many people.

How do we withstand the pressure in the environmental community—I am saying that community charged with the responsibility of carrying out these things—how do we withstand the pressure? Do we need more Federal laws? More Federal commitment backing up these people who have that responsibility? I do not know.

It is a real jam that it puts all of us in because none of us want to see jobs lost, and yet, we know that the long-range commitment that we have to the environment has to be. There is no way around it. So, what do we do?

Ms. SMITH. I will take a first shot at that, if I may.

Those are difficult issues, and the reason we are calling for this gorilla in the closet, we are calling for Federal leadership. We do not envision that there are going to be millions and millions of new people from EPA who run out from Washington to tell every homeowner in Illinois where to site his septic tank. But basically, we have to draw a partnership with some backbone at the Federal level, so that when things fall through the cracks, when they do not work out, as in many cases they are not working adequately, there is some Federal backbone.

I mentioned the economic blackmail as essentially the kind of situation I was trying to refer to, as you describe. We think that at least things would be better if one community is not competing with another for business with the cost being drinking water. If people did not have to say, "We will allow you to pollute more than the neighboring community if you will just expand your plant over here." But those should not be the kinds of choices that people have to make.

In my spare time, I sit on the Virginia State Water Control Board, and we have been in the news of late because we had to make a very, very, very tough decision to close a manufacturing facility that used to be a major employer and still employed 400 people. That is a very, very painful decision to make at the State level. Those kinds of things are very hard to do if you do not feel that there is some back up to you in terms of national minimum standards.

Mr. POSHARD. Minimum standards obviously are needed and obviously came into play in your involvement with that industry. But what I found to be more helpful to you or perhaps have the heavier hammer for you was the national media attention that was focused on that problem in Virginia, which leads to my second question.

Excuse me, Mr. Chairman, for going on here.

Chairman TORRES. Proceed, Mr. Poshard.

Mr. POSHARD. What do we need to do?

When we talk about underground water contamination, I said to the chairman last week when he was in my district on a different environmental problem that, "I think underground water pollution is the next greatest crisis to face this country." I honestly believe that, because it is everywhere. It is so widespread. No one has any answers with any specificity at this point in time as to what we actually need to do and no one can possibly comprehend the hundreds of billions of dollars it is going to take to solve this problem.

But what do we do when hardly anyone in the communities which I represent, and I am talking about even the people who are responsible for those kinds of pollutants, let alone the general public, hardly anyone has any public awareness of these issues? How do we raise that? What is it we need to do from the Federal perspective to start building a consensus among the business community, the industrial community, the environmental community,

the general public? What do we need to do to raise public awareness toward these very serious problems?

I do not know. In most people's minds it is way out there somewhere as a nebulous little problem we are going to face 100 years down the road. But it is a lot sooner than that. What are your organizations doing to raise public awareness?

Mr. OLSON. Let me take a crack at that. We do have some monitoring going on in every State. In Illinois the USGS does monitoring. The State EPA does monitoring. The State Geological Survey does monitoring. There are many different agencies that test the water to figure out how contaminated it is. One of the problems traditionally has been that those tests are sitting somewhere gathering dust in somebody's files, and there is not a lot of public education going on about how serious the contamination is.

So, we think that one important thing that has to be done is to take the monitoring data that are available. There is actually one centralized repository at EPA called the STORAD Data Base that has the data. It is important for State and Federal officials to get out and educate the people about how serious the contamination problems are.

There is one other important development which is that the number of drinking water standards is increasing—there have only been about two dozen contaminants that have been regulated for the past 10 or 15 years. That number is now going to multiply by about fivefold—in the next several months actually—as a lot of the new standards become enforceable, which means that we are going to have around 100 contaminants that have to be tested for in drinking water supplies. That is going to cause an explosion, I hope, in public concern and knowledge about how serious the contamination problems are.

We are just now seeing more monitoring going on of a lot of these public water supplies, and we need to notify the public when their water is contaminated.

One other thing that we have tried to do is, there is a program under the Safe Drinking Water Act that if people are getting water that violates the Federal standards, they are supposed to be notified of that fact.

We recently issued a report that found that in 94 percent of the cases that is not happening. So, only 6 percent of the time are people learning that their water is contaminated above the standards when Federal law requires them to be notified of that fact.

Clearly, that is something that EPA can do something about. They are required by Federal law to enforce that Safe Drinking Water Act, and they are not doing it.

Mr. POSHARD. I would like to see us in some measure or another begin to develop, aside from just passing a few comments in the science classes in the country from junior high on up, the importance of environmental quality.

I would like to see us develop some curriculum that would be implemented as part of the course work of children from very early grades up to begin to make them aware and sensitive to some of these issues. I think that is the only way we are going to get the overall education that people need and sensitivity to these things.

One other quick question, just very quickly. I know as a society we are always reactive instead of proactive in terms of beating these problems, but you mentioned something very important. Mr. Chairman, I took the time to look during this past session at all of the grant proposals and so on that have come in to the Department of Agriculture, and to EPA, and others on the different kinds of research that is being proposed to meet a wide array of environmental problems. I cannot believe the number of research proposals that are submitted that really reinvent the wheel.

Who should be involved with prioritizing what the cutting edge proposals ought to be in terms of research on environmental issues? Do we just leave it up to the bureaucratic organizations? Do you people participate in that? I would like to see some sort of clearinghouse effort to say, as you said in your testimony, we do not need to prove this all over again. We do not need to have five more studies to confirm that this type of pollution exists if you do this sort of activity.

But we are not doing that. We continue to fund, year after year, research which has already been performed, which we already have the answers for in terms of the problem. How do we do that? How do we develop a national clearinghouse effort to say, "We do not need to spend another $15 million on this issue"?

Mr. OLSON. One proposal that has been put forward by EPA's Science Advisory Board, and actually Congressman Scheuer, I believe, held a hearing on it not too long ago, was to create a national clearinghouse that would try to put together some sort of organized group that would decide what kinds of research really is necessary. I am not sure if there is political control over that, whether that is really going to solve the problem, however, because if OMB can basically veto or direct what kind of research is going to happen, we all know that we are going to research everything to death and nothing will ever get done. Just like in the acid rain situation.

But I think that there is definitely room for a more coordinated research effort. Part of that really ought to come from Congress to get the Federal Government's act together and to move forward rather than simply researching all these problems forever.

Ms. SMITH. I would just like to maybe offer a similar perspective on that. I think that there is inevitably a certain tension between policymakers and researchers. Scientists do not want the policy people who do not understand the nuts and bolts telling them what they need to do and what basic research needs they have.

But, on the other hand, sometimes the scientific community will continue to focus on the same issues or tiny details on things when other policy issues are pressing.

So, I think there is a strong burden on Congress to think of the question that you are asking as you look at a variety of research proposals.

For example, some proposals have been floating around with regard to research on fertilizers. Some of those have been very general, "Let us look at whether nitrates are a problem at all." We are beyond that sort of thing.

I think the Congress is going to have to, as you look at research, try to examine what is at the cutting edge and what is just the same old stuff again.

Chairman TORRES. I want to thank Mr. Poshard for being with us. As you can see, Mr. Poshard is a well-prepared member of our subcommittee. He asks the right questions. He is probing and that is very important for us because we get good answers from you. We get the kind of answers that will help our subcommittee staff prepare the kind of report that we need to have to move on with these areas.

Indeed, the two of you, Ms. Smith and Mr. Olson, are the acknowledged experts on ground water for the environmental community, and I really appreciate your being here today.

By the way, I am sorry that the representatives from the National Environmental Development Association and also the Chemical Manufacturer's Association were unable to attend this hearing. They did say that they would send us testimony in writing, and we will look forward to that.

Had they been here, I would have asked them a number of questions. I would have asked them two very salient questions. I wanted to ask those of you, although you have already answered them in terms of Mr. Poshard's line of questioning. But I want to make sure that the record and that the staff has these questions that we may submit to those two gentlemen or to those representatives who were not here.

What I want to ask both of you is, do you believe that the ground water protection programs in place at this time are sufficient? You have already answered Mr. Poshard and me in terms of those, but we would like to pose those to the two absent representatives.

Moreover, do the States have the resources or not even that, more importantly, do the States have the inclination to adequately handle the job? So, I would beseech the staff to make sure that those representatives have those questions.

I have seen the report that the environmental community has authored last year, and I think it is a very concise, important document. Are there any things that have happened, do you believe, that would call for any changes in your conclusions as stated here?

Ms. SMITH. I think in general what we tried to lay out was a framework and to suggest specifically what would the policy structure be. What would the skeleton be. As long as the report is, we still recognize that it needs hashing over, and it needs further refinement. We still lay it out there as one option for a comprehensive program. Frankly, it is a hard issue to get your arms around. It is so big. We hope that many people will take a look at it and criticize and help us improve that.

Mr. OLSON. I would like to just briefly answer your two questions, if I may.

Chairman TORRES. Surely, Mr. Olson.

Mr. OLSON. Your first question was, is the current ground water protection program sufficient? Clearly, from our testimony, we do not think so. I have attached an appendix, which is relatively short, to my testimony, going through the Federal programs and where the big holes are in the Federal programs.

Basically, the conclusion is that although EPA has frequently put out documents that say, well, we have 270 programs regulating ground water in some way, if you get underneath the surface and

actually figure out what those programs are doing, many of them, frankly, are not doing anything.

There are major sources—fertilizers are one classic example—where there is no legislation federally. There is not any legislation in probably 90 percent of the States that really regulates the application of fertilizers. So, there are huge gaps in the current program.

Chairman TORRES. Apart from fertilizers, you mentioned in your testimony a whole range of activity that takes place, that is, that there are no regulations in place.

Mr. OLSON. Yes; I mean it is not just fertilizers. Pesticides are another example where right now what we have is an EPA strategy which would ultimately, we hope, start to control some pesticides. It is basically a case-by-case approach, and, frankly, we do not think it is going to have any long-term effect the way it has been proposed so far.

Your second question was, do the States have the resources or the inclination to do the job? I have spent the last 3 years writing a book on what the States are doing in each State.

Basically, my conclusion is that there are some States, there are as many four or five States that are sort of ahead of the eight ball and are trying to really get things done. In none of those States are all sources regulated, however.

Then there are probably 10 to 15 States which are doing virtually nothing beyond what is required by Federal law. There is a large middle group of States which are doing a little bit for some sources and are not willing to take on the tough local industries that are able to essentially blackmail them into not doing anything.

So, I think clearly the States right now in general do not have the political wherewithal to do what is necessary. Most of them just do not have the resources to fully implement a ground water protection program.

Chairman TORRES. Ms. Smith, do you care to add anything?

Ms. SMITH. Just full concurrence and a note that in some cases authority exists at a Federal level to do something, but that authority has been there and has not been utilized.

One of the things EPA points out numerous times is that many States are doing things, and if you look at what the States have been doing, many of the State programs that are cited relate to underground storage tanks. I would just remind members of the committee that Congress is the one that said, "We are going to regulate underground storage tanks."

So, it took a congressional push to get that going, and we hope you are going to soon be ready for some more congressional push.

Chairman TORRES. Thank you. I want to thank all the panelists that were here today to provide testimony to us.

Some of them are still here. Mr. Jochem is still here. You should know that our hearing that was held in the San Gabriel Valley relative to the management of the Superfund sites there is now available and you may want to avail yourselves to a copy of this, Mr. Jochem, Ms. Smith, and Mr. Olson. They provide a very good description of exactly what the problem is there and how the testimony, both from EPA and the public, is very concise on this question.

I want to thank, of course, Mr. Poshard and Mr. Engel, members of the subcommittee, and Mr. Hiler and Mr. Smoots who were here. I think that this is an expression of interest by them and their staffs.

I want to thank the staff director, Mr. Jorge Haynes. Essentially and most importantly, Ms. Fran McColan, who has helped us very much in development of the logistics that we need here to have a good hearing. I think we have had a good hearing today, and I want to thank you all again.

Having said that, I now adjourn this panel.

[Whereupon, at 12 p.m., the subcommittee was adjourned, subject to the call of the Chair.]

APPENDIX

SUBCOMMITTEE ON ENVIRONMENT AND LABOR
OF THE
COMMITTEE ON SMALL BUSINESS

HEARING ON GROUNDWATER CONTAMINATION IN THE UNITED STATES

November 14, 1989

Opening Statement
Congressman Esteban E. Torres

Thank you for coming today. This is the second in a series of hearing that this subcommittee has scheduled on the issue of groundwater. I appreciate the patience that all of you have displayed in arranging your schedules in order to attend this hearing.

Groundwater is our topic today. Do we, in fact, have a national groundwater problem? And is the federal government devoting sufficient resources to this issue.

I've requested that we hear from a number of people with different views. First, we'll hear from a representative from the San Gabriel Valley Watermaster's Office about the severity of the problem in the San Gabriel Valley in California. As most of you know, the San Gabriel Valley includes the area that I represent, and it has some of the worst groundwater contamination in the United States. The second panel will consist of representatives from the Environmental Protection Agency to explain the federal programs currently in place and those that are planned for the future. Finally, representatives from industry and the environmental community will share with us their thoughts on the current and future state of the resource.

I believe that groundwater is one of our most important, yet most easily ignored, natural resources. For many years, everyone, including scientists, believe that groundwater was essentially pure. It was believed groundwater couldn't be contaminated by surface activities. Now we are seeing in frightening numbers, that this is not the case. However, the myth persists. The philosophy of "out-of-sight, out-of-mind." and, "What you can't see, can't hurt you" seems to reign supreme.

However, since 19 million people rely on groundwater as their primary drinking water, and the crops and animals that all of us consume are nurtured on groundwater, we have a responsibility to see to it that the essential resource, groundwater, is kept safe.

As many of you know, in my own district in California, we have the worst case of groundwater contamination in the Western United States. And no one knows why! Five percent of the people who rely on groundwater in the United States are served by the San Gabriel Valley. Contamination by volitale organic compounds, has rendered over 60 wells unfit for human use. We have seen contamination at levels 360 times that considered safe by EPA. Yet we don't know why and if the pollution is continuing.

What we have come here today to find out, is whether the groundwater available to the other 95% of Americans who rely on groundwater is as polluted as it is in the San Gabriel Valley. And, if it isn't that polluted yet, what are we doing to prevent it from happening in the future.

The Torres Report:

Groundwater Crisis

Congressman Esteban E. Torres
Washington, D.C.
November 14, 1989

THE TORRES REPORT:

GROUNDWATER CRISIS

PREFACE

Much of the groundwater of the United States is in trouble. Crisis levels of contamination have been reported in many parts of the country and something must be done immediately if we are to preserve this essential natural resource.

Groundwater contamination is not new - but our awareness of it is recent. The problems within our ground have remained long hidden because the underground segment of the hydrologic cycle is difficult to monitor and because most of the substances that cause problems are colorless, odorless and otherwise unobservable without special scientific equipment (OTA, 1984). Very often the problem is not discovered until it is well advanced. The scientific understanding of groundwater contamination and its cleanup is still at a rudimentary stage, and, unfortunately, this means that the regulatory efforts have been rudimentary as well (Tiemann, 1988).

What is clear, however, is that the contamination of our groundwater has reached near crisis proportions in some areas. Like all of our so-called "renewable resources" we have to consider what price we are paying now, and will continue to pay into the future, for allowing our Nation's groundwater to be destroyed or to become essentially unusable.

This report is designed to draw attention to the critical importance of groundwater, its contamination and possible solutions.

Section I contains an overview of the science of groundwater — what it is and how we use it. Section II draws attention to the extent of the contamination problem. Knowing how groundwater becomes polluted is essential if clean-up solutions are to be implemented and preventative steps are to be taken in the future.

Section III is an explanation of the current groundwater protection strategies and Section IV analyzes Superfund - our national cleanup legislation.

Section V presents an important case study. This section relays the story of the San Gabriel Valley in Southern California. This section demonstrates the critical need to review the Superfund Program in light of its apparent inability to either protect or preserve the groundwater of the San Gabriel Valley. This section also demonstrates the need to look at national programs to protect our groundwater resources for the future.

I. GROUNDWATER: WHAT IS IT?

Groundwater is one of our most abundant natural resources. It constitutes nearly 97% (Wilson, 1982) of the unfrozen fresh water in the world.[1] [2] Nearly 50 times the volume of the Nation's surface water is located below the surface of the earth. Groundwater constitutes the primary drinking water source for half the population of the United States, nearly 117 million people (Patrick, 1987). Of this group, 29% use groundwater delivered by community systems and another 19% use their own domestic wells. Practically none of the domestic wells in the United States are subject to routine or even initial evaluation of water quality (Miller, 1980) and the situation is even worse in terms of testing for chemical contamination. Additionally, nearly 75% of American cities depend, in some part, on groundwater for their drinking water supplies.

Water enters (recharges) the groundwater system through precipitation during and after rainfall and snow melt, and by infiltration from rivers, streams and lakes. The water then percolates into underground areas, called "aquifers".[3]

Aquifers" are classified as either "confined" or "unconfined." Water in a confined aquifer is below a layer of less permeable material, such as shale or clay. A confined aquifer is therefore relatively immune to contamination from water percolating down from the surface, except in its recharge area. Water in an unconfined aquifer has no similar protection. Contaminants from surface activities may seep easily into an unconfined aquifer (Wilson, 1982). Water is never stagnant within the ground. Depending on soil and rock types, water in aquifers flows at different rates towards the sea or its natural discharge area.[4] Unlike rivers or streams, groundwater usually moves very slowly. The average rate of groundwater movement is one meter (3.28 feet) per day [5] or one kilometer (0.62 miles) every three years (Ehrich, 1977).[6] However, contaminants within groundwater, as we shall see later, do not necessarily move at the same velocity as the groundwater itself.

The groundwater system does not have the natural ability to cleanse itself of most pollutants, although natural microbial agents have been shown to degrade some contaminants. Since scientists estimate that it can take an individual molecule of water up to 10,000 years (Freeze & Cherry, 1979) to circulate within the groundwater segment of the hydrologic system, groundwater should be treated as if it were a closed system, without the ability to be cleansed by natural processes.

Groundwater is a resource that is in high demand. Overall groundwater consumption has doubled during the past 35 years. Although current figures reflect a dip in the demand curve during the period 1980 to 1985 (USGS, 1988b), it is unclear whether this is a real reduction in demand. The latest figures could reflect increased energy prices, increased water costs or temporary conservation measures due to severe droughts in some sections of the country. However, as Table 1 indicates, the historical trend shows an ever increasing demand on the clean water supply.

TABLE 1

Historical Trends in U.S. Groundwater Use As a Percentage of Withdrawals
1950 - 1980

	1950	1960	1970	1975	1980
Total Fresh Groundwater Withdrawals (bgd)	34	50	68	82	88
Public Supplies (%)	12	13	14	13	14
Rural Supplies (%)	8	6	5	5	5
Irrigation (%)	62	68	66	69	68
Industry (%)	18	13	15	14	13

Source: Patrick, 1987

California withdraws more water (from both surface and ground water) than any other state in the United States and more than twice as much as either of the next two largest users (USGS, 1988b). Agriculture uses 85% of the water consumed in California although it produces only three percent of the state's economy (Askari, 1988).

The increasing demand on groundwater resources has strained the water systems in certain regions of the country. When water is pumped in excess of the natural ability of the groundwater system to recharge itself, the system is considered "overdrafted" (Patrick, 1987). Problems which have occurred due to overdrafting include: reduced water pressure for artesian wells (wells which provide water through internal pressure); land subsidence; reduced spring and stream flow; and the intrusion of salt water. While only saltwater intrusion is an actual "contamination" issue, all of the problems associated with overdrafting contribute to the overall stress on the resource. Additionally, overdrafted aquifers result in the need for deeper wells as the water levels go down. These deeper wells increase energy costs for the consumer and reduce the dependability of the groundwater basin.

I. GROUNDWATER: CONTAMINATION AND POLLUTION

A. EXTENT OF THE PROBLEM

The extent of groundwater pollution has not been clearly defined because of a lack of systematic sampling. However, data from a wide variety of sources indicates that we are facing a potentially large problem.

For the purposes of this report, groundwater is considered contaminated if any element, compound or organism has been added which alters the composition of the water. When contamination reaches levels that render the water unfit for human consumption, the water is considered polluted (Patrick, 1987).

Under the Safe Drinking Water Act, the Environmental Protection Agency (EPA) is directed to establish Maximum Contamination Levels (MCL) for all contaminants to which humans are exposed. These are health based standards and are measurable at the tap. Agriculture is generally not restricted in its water use by water quality standards. It is not uncommon for semi-polluted water to be used in agriculture, absorbing more pollution, especially salts, each time the water leaves and then re-enters the system (river, lake or aquifer).

Groundwater has historically been contaminated with impurities like bacteria, road salt, nitrate and viruses. It has always been assumed that the environment could readily dilute ordisperse these contaminants. Now evidence is mounting that highly complex man-made toxics also pollute our groundwater.

Estimates of the extent of groundwater pollution are based largely on best guesses, but the pollution is believed to be widespread especially in areas where the groundwater is close to the surface and where potential sources are abundant.

Groundwater pollution, as the result of pesticide contamination, is an example of a case where a lack of information can lead to serious problems. Pesticides in groundwater have only been commonly recognized as a problem since the early 1980's.[7] Up until then, it was assumed that pesticides volatilize rapidly (were passed off as gas) or were "permanently" bonded to soil particles before reaching the groundwater. Pesticide residue, according to this theory, would not enter the groundwater system (Holden, 1986). According to the US Public Interest Research Group (USPIRG) 2.6 billion pounds of pesticides are used each year (Hinds, 1988) and much of it could be finding its way into the groundwater since only a small percentage of the chemical is actually taken up by the plant. In California, contamination by 57 pesticides has been found in 3,000 wells in 28 counties. In California's Central Valley, over 1,400 wells have been found to be unsuitable for drinking, cooking or bathing.

An additional study, covering the groundwater of 34 states, found the presence of 73 different pesticides in the groundwater. Twenty-five of the identified pesticides have been classified by EPA as possible carcinogens. Additionally, eighteen of the identified pesticides can cause birth defects and fourteen can cause genetic damage. At least ten states have detected eight or more pesticides in their groundwater (Hinds, 1988).

Other examples of the magnitude of the groundwater problem:

17% of all Californians and 30% of the residents of Los Angeles have chosen to pay to have special water supplies brought into their homes to avoid the need to drink what comes out of their tap (Pope, 1986).

Within the last five years contamination has forced the closure of over 2,800 wells in California, 2,600 in Long Island, 700 in Connecticut, 500 in New Jersey and 250 in Massachusetts (Tiemann, 1988).

In 1984, 4,400 well contamination incidents werereported by 21 states (Tiemann, 1988).

Data from EPA's Groundwater Supply Survey, released in 1983, shows the presence of one or more industrial solvents in twenty-eight percent of the randomly selected groundwater supplies serving populations of more than 10,000 persons (EPA, 1987).

Over 70% of the 951 hazardous waste sites on the Superfund priority list (as of July 1987) have caused groundwater contamination (Tiemann, 1988).

The US Geological Survey, after testing more than 120,000 wells across the country, found nitrate contamination in 48 states, with contamination levels in some states exceeding health standards in over 20% of the wells tested (Madison, 1984).

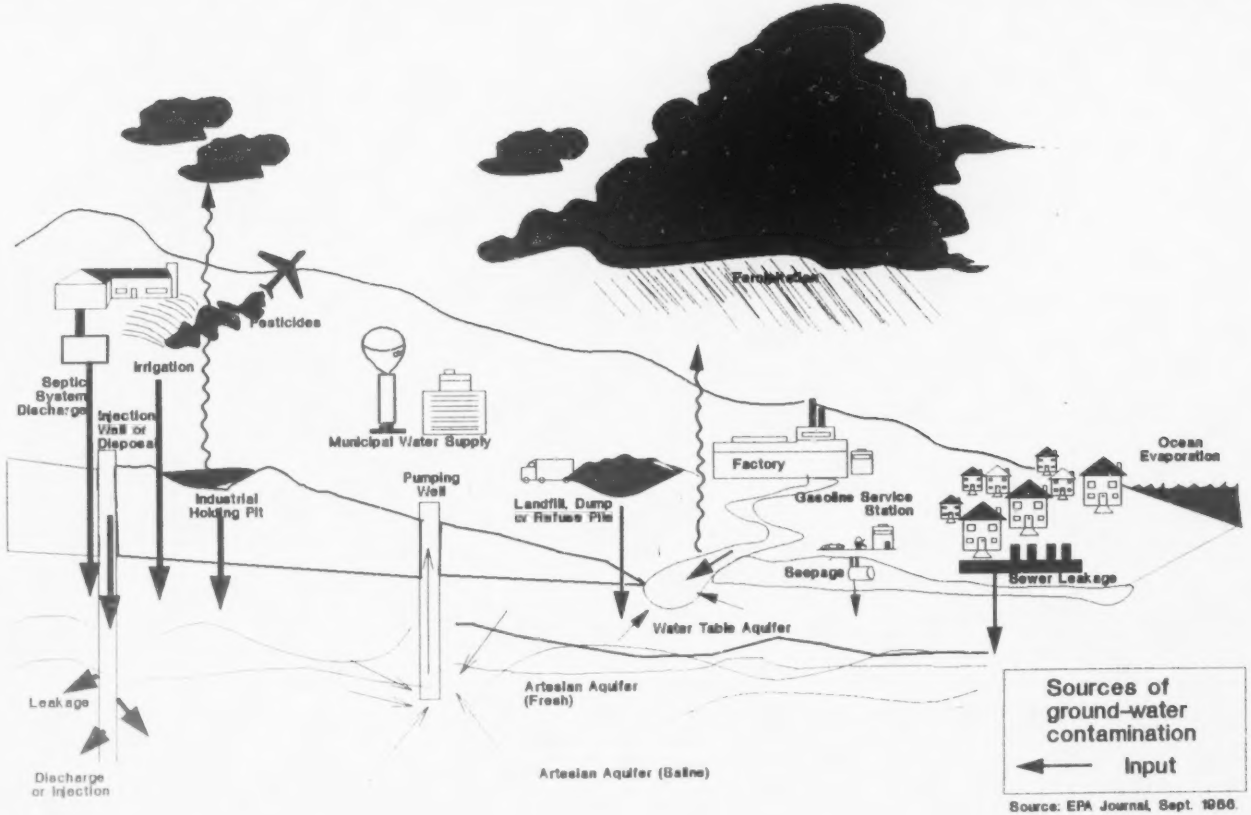
1. Action of contaminants within groundwater systems

While it can generally be assumed that contaminants move and disperse with the flow of the groundwater, some contaminants, depending on their specific chemical properties, may not. For example, if sufficient liquid petroleum products are present, they may spread out on top of the aquifer and they may not move very far from their point of entry because of the "...limiting effect of the surface tension between the liquid and the water-coated grains of the unconsolidated material." In other words, 'oil and water don't mix.' "However, dissolved chemicals from these petroleum hydrocarbons (may) move with the groundwater" (Patrick, 1987).

Under certain controlled circumstances, with a known quantity of contaminants, at an early stage, it might be possible to effect a rapid, cost effective groundwater clean-up. Cleanup would be pointless unless the source of the contaminants was also identified and stopped.

Such cleanups, however, are complicated by the fact that groundwater plume movement is difficult to predict. Plume movement depends principally on four factors: on the type of contaminants; present geologic formation; rate of current pumping; and, rate of recharge into the aquifer. Of these four factors, the type of chemical contaminant is the most important, since different chemicals move at different rates. Groundwater plumes which contain a number of chemicals could have different layers moving at different rates. This makes the cleanup process even more difficult.

Sources of Ground-Water Contamination



Source: EPA Journal, Sept. 1986

hazardous waste disposed of in the U.S. has been pumped into wells. The majority of the wells in operation (140,000) are used either for brine disposal or for the injection of fluids used in the enhanced oil recovery process (Patrick, 1987). EPA identifies five classes of wells. Class I wells handle industrial and municipal hazardous and non-hazardouswastes.[12] Class II wells accept fluids associated with oil and gas production, such as brines, and wastewaters from the operations of gas plants. Class III wells are used for injecting leaching solutions into the earth for in-situ mining of oil shale, uranium and other metals, sulfur, salts and potash. Class IV wells are used for the injection of hazardous and radioactive wastes into shallow formations at or above the level of potable water supplies. (This disposal practice was banned in 1985, although 44 wells were put into production). Class V wells are all remaining injection wells used to prevent saltwater intrusion; to inject municipal, industrial and agricultural wastewater; to control subsidence; and to dispose of nuclear materials.

Underground injection continues, despite the fact that evidence exists that the process does not completely isolate the waste from the sub-surface soil. Thus the injection material can enter and contaminate the groundwater. At least eighteen states have already experienced contamination problems as a result of underground injection activities (EPA, 1985).

Old and unplugged artesian water wells can pose an additional problem related to the use of injection wells. The unplugged wells can act as a conduit to the material being injected with the potential of upward migration of the contaminant into the aquifer (OTA, 1984).

Improperly operated underground injection wells have also been reported to cause increased pressure along existing earthquake fault lines. The resulting earthquakes can cause additional groundwater problems (Patrick, 1987).

A number of states (i.e. Nevada, Arizona, Virginia & Wisconsin) have completely prohibited injection wells and others (Iowa, Massachusetts, Missouri, New Hampshire, North Carolina, Rhode Island & Washington) have prohibited Class I - IV wells and restricted Class V wells because of the problems associated with this type of waste disposal practice (Tiemann, 1989).

SEPTIC SYSTEMS

Individual septic tank systems, of which there are almost 20 million, serve 29% of U.S. households (Miller, 1980). Estimates are that the daily discharge rate from these systems is 3.5billion gallons of waste per day. If the septic systems are not properly built or maintained, this untreated effluent threatens the groundwater with bacteria and nitrates. Additionally, septic systems are not designed to 'treat' material currently being disposed in them like organic cleaning solvents. Organic solvents present a serious problem because no attempt is made to treat this hazardous material before it enters the soil. The soil may not have the ability to break down synthetic organic chemicals. Where historically, the soil components were able to absorb and breakdown a certain amount of pollution, the new synthetic organic chemicals can pass through the ground and into the underground water supply. Pollution from septic tanks is often dangerous because the very communities which rely on individual septic systems also rely on individual wells for drinking water.

b. Non-Waste Disposal Activities

The most serious of the non-waste disposal activities include: runoff from agricultural, mining, oil, gas and silviculture operations, feed lot operations, accidental spills , leakage from underground storage tanks, roadway de-icing agents and acid precipitation.

AGRICULTURAL OPERATIONS

Pesticides, which were discussed briefly earlier, represent a major economic component of the modern farming operation. Fertilizers represent another major economic investment. Fifty-four million tons of fertilizer were used in the United States between 1980 and 1981 (OTA, 1984). The nitrogen component of fertilizer represents from between 6.1% to 20.4% of the volume. Most of the nitrogen is not utilized by the crop, but is washed into the soil where it can pass (leach) into the groundwater.

MINING, OIL, GAS AND SILVICULTURE OPERATIONS

The mining of fuel and non-fuel minerals creates pollution which can adversely effect groundwater. Pollution can be generated from the mining operations itself, the disposal of mineral wastes, and the processing of the ore and the waste it creates.

FEEDLOT OPERATIONS

Feedlot operations can cause severe groundwater problems because intense concentrations of feedlot byproducts, nitrate and bacteria, often pass into and through the soil to contaminate the groundwater (Miller, 1980).

ACCIDENTAL SPILLS

Another significant non-point source is 'accidental spills', including spills of hazardous materials during use, transport or transfer.

UNDERGROUND STORAGE TANKS

Leaks from underground storage tanks (both abandoned and active)and from pipelines is probable the most significant source of groundwater pollution. Underground storage tank leaks have been reported in all 50 states (Patrick, 1987), with many states indicating that it is their leading cause of groundwater pollution (EPA, 1985b). In 1984 there were 2,500 reported incidents of groundwater contamination from leaking underground storage tanks

Information about the number of underground storage tanks is sketchy. Estimates are that there are more than 2.5 million underground tanks containing more than 25 billion gallons of non-hazardous liquids. Additional there are a reported 2,031 hazardous storage and treatment tanks containing an stimated 13.8 billion gallons of hazardous substances (OTA, 1984). It is believed that a large percentage of the known underground storage tanks are not monitored and are currently leaking into the ground. We are also aware that there is widespread unreporting of the existence of underground storage tanks, either through duplicity or ignorance.

DEICING AGENTS

Because of the extensive use of roadway deicing agents in certain parts of the country, serious problems have developed. These highly abrasive salts when mixed with the normal runoff can percolates through adjacent soils or otherwise find their way into the groundwater via storm drains. High concentrations of chloride have been reported in the groundwater of communities which rely on salt deicing agents, especially in places where the salts have been improperly stored (in open piles) or where excessive amounts have been used.

ACID PRECIPITATION AND RADIONUCLIDES

Additional categories of potential contamination of groundwater are acid precipitation [13] and radionuclides.[14]

Acid precipitation is an area of potential groundwater contamination that is not well understood. Some evidence indicates that acid precipitation may react with soil and surfacewater in such a way as to make it easier for chemicals and nutrients to leach into an aquifer (Patrick, 1987). In fact, some scientific evidence indicates that acid precipitation may free up elements, like selenium and aluminum normally bound to soil particles and allows those chemicals to contaminate the groundwater system.

Depending on the local geology, some naturally occurring radionuclides are found in the groundwater system (Patrick, 1987). However, additional radionuclides from the production, generation and use of nuclear fuel and radioactive materials have found their way into the groundwater at several sites in the United States. Only recently has it become clear how widespread the contamination from radionuclides may be (DOE, 1988).

C. EFFECTS OF CONTAMINATION

Contamination of the groundwater can effect life in either of two forms: biological or chemical:

Biological Effects:

The biological contaminants found in groundwater include: bacteria, viruses, protozoa, and fungi. EPA reported that between 1971 and 1982 microbes in groundwater caused 204 reported health contamination incidents with 34,337 cases of reported illness (CDC, 1985).

Chemical Effects: Acute or Chronic:

The health sciences have long studied the health effects of certain micro-organisms [15] and radionuclides. In contrast, scientists have only begun to study the effect on humans of the many man-made chemicals, now reaching our groundwater.

Acute health effects caused by chemical contamination are generally rare. Between 1959 and 1980, EPA reported 303 cases of illness caused by copper, selenium, fluoride, nitrate, arsenic and sodium hydroxide. However, these are only the reported cases of acute poisoning.

Acute health effects are easier to spot because they occur soon after exposure. The most insidious problem is the continuing low-level, chronic human exposure to toxic chemicals on a daily basis. Chronic effects can include cancer, mutations, immunological changes, birth defects and other reproductive problems (CF, 1987).

Exposure to groundwater contaminants can occur either directly, through ingesting the water (eating or drinking it), or indirectly through skin exposure (bathing) and inhalation of volatilized air in the kitchen or shower.

It is a well known scientific fact that some chemicals, when combined with one another may produce a completely different reaction in the human body than the effects of the individual chemicals alone. This phenomenon complicates the study of the long-term health effects of chemical exposure.

III. GROUNDWATER: WHICH LAWS PROTECT AND PRESERVE IT

No one federal law covers all issues of federal groundwater protection. In fact, the Environmental Protection Agency (EPA) administers six different Federal environmental laws containing aspects of groundwater protection. The EPA and the United States Department of Agriculture (USDA) provide the bulk of the Federal efforts to protect groundwater. Additionally, the U.S. Department of Interior, U.S. Geological Survey (USGS) is responsible for keeping track of the condition of the ground-water in the United States.

Table 2
Summary of Federal Programs and Activities
Related to the Protection of Groundwater Quality

	Investigation/detection				Correction		Prevention				
	Inventories of sources[a]	Ambient gross chemical monitoring	Groundwater monitoring related to sources[a]	Water supply monitoring	Federally funded remedial actions	Regulatory requirements for sources[a]	Regulate chemical production	Standards for nonmonitoring sources[a]	Aquifer protection	Standards	Other[b]
Atomic Energy Act			x		x	x		x		x	
Clean Water Act	x	x	x		x			x		x	x
Coast l Zone Management Act											x
Comprehensive Environmental Response, Compensation and Liability Act	x		x		x						
Federal Insecticide, Fungicide and Rodenticide Act			x				x	x			
Federal Land Policy and Management Act (and associated mining laws)			x					x			
Hazardous Liquid Pipeline Safety Act	x							x			
Hazardous Materials Transportation Act	x							x			
National Environmental Policy Act											x
Reclamation Act					x						
Resource Conservation and Recovery Act	x		x			x		x			
Safe Drinking Water Act	x		x					x	x	x	
Surface Mining Control and Reclamation Act			x		x			x			
Toxic Substances Control Act			x				x	x			
Uranium Mill Tailings Radiation Control Act			x		x	x		x			
Water Research and Development Act											x

[a]Programs and activities under this heading relate directly to specific sources of groundwater contamination. Table 13 summarizes the sources addressed by the statutes.
[b]This category includes activities such as research and development and grants to the States to develop ground-water-related programs.

SOURCE: Office of Technology Assessment.

In addition to the federal legislation designed to protect and preserve ground-water, every state has laws pertaining to its own ground-water situation. However, they vary significantly. The preponderance of state laws relate to quantity and supply (water rights) rather than protection of groundwater quality. A number of states have developed programs designed to protect the quality of the groundwater. however, no two states have identical standards. Some states have standards based on use or potential use and some are designed to help protect public health and welfare, aquatic life, and recreational use.

In 26 states or territories, numeric water quality standards [16] are applied to groundwater; 15 states or territories use narrative standards [17]; and 23 utilize both narrative and numeric groundwater quality standards. The interstate nature of many aquifers and the difficulty in evaluating the effectiveness of the diverse State laws have raised questions about the need for increased Federal leadership in groundwater protection.

EPA PROGRAM

In 1979-1980, EPA recognized ground-water contamination as a problem which was both "immense" and represented "years of neglect." EPA then developed a strategy to provide clear goals and objectives; a national program with fully defined federal and state roles. The strategy covered every aspect of groundwater from data collection to management, and included a short-term action plan as well as a long-term strategy.

However, when Ronald Reagan was elected President in 1980, the new administration felt that the strategy interfered with states rights, forcing EPA withdrew the strategy. It wasn't until 1984 that EPA proposed a revised Groundwater Protection Strategy that was limited to:

1. Providing financial support to the states for program development;

2. Assessing problems from unaddressed sources ofcontamination;

3. Developing guidelines for EPA's decisions affecting groundwater under existing Federal statutes; and,

4. Establishing an Office of Ground-Water Protection.

This strategy is still in effect today.

While EPA stressed that "prevention of contamination must be the primary focus of protection efforts", many people in the environmental community do not believe that the current strategy will do much to solve the problem.

An example of the ineffectiveness of the current strategy occurred in June, 1988, when EPA declined to restrict the use of the pesticide aldicarb, a known carcinogen. For more than 10 years EPA has been aware of widespread ground-water contamination by aldicarb. In making this decision, EPA made it clear that they were not going to regulate using the more protective 'health based standards' (MCLGs).

As another example of EPA decision making in this area, EPA has decided rather than encourage the development of conprehensive federal protective legislation, the Agency will continue to encourage the hodgepodge of state-by-state regulations that already exists. EPA will permit the states to develop groundwater protection plans and pesticide regulation plans as the state sees fit. If a state plan meets EPA criteria, the plan will be implemented and run by the state. If no plan is developed or approved, EPA will regulate the state. If national EPA criteria are not met in a plan, the state must upgrade the plan or else EPA will assume responsibility. In doing this EPA is deferring regulation to the states and will allow them to "write-off" some groundwater as unworthy of protection.

IV. GROUNDWATER: SALVAGING THE CONTAMINATED RESOURCE - IS SUPERFUND DOING THE JOB?

In any discussion of groundwater contamination, it is necessary to consider both the efforts to clean up contaminated water and the efforts to prevent further contamination. This section of the report deals with the involvement of the Federal Government, through Superfund, to effect cleanup of the worst cases of groundwater contamination.

The Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) is commonly known as Superfund. It was established as a response to the growing dangers posed by hazardous waste at abandoned sites throughout the nation. As originally enacted it contained several key objectives:

1. To set priorities for cleaning up the worst existing hazardous waste sites;

2. To make responsible parties pay cleanups costs where ever possible;

3. To set up a $1.6 billion Hazardous Waste Trust Fund - (Superfund) - for the twofold purpose of performing remedial cleanups in cases where responsible parties could not be held accountable, and responding to emergency situations involving hazardous substances; and,

4. To advance scientific and technological capabilities in all aspects of hazardous waste management, treatment and disposal.

Superfund was originally funded by a tax on crude oil and 42 different commercial chemicals. State governments were to pay 10 percent of the cost of Superfund work at privately owned sites and 50 percent at those sites that were publicly owned, unless responsible parties could be found who were able to pay for the remediation necessary. Since 1980, 951 sites have been placed on the National Priority List. Since seventy percent of those sites contain groundwater contamination, proper execution of the Superfund Program is essential to the survival of groundwater as a usable resource.

In 1986 Congress rewrote the Superfund Act because the taxing authority had expired at the end of fiscal year 1985. Congress realized that the program was seriously under funded for the magnitude of the work required, and that the law itself required strengthening. The first six years of the program was riddled with scandal and accomplished little. There was protracted litigation over the constitutionality and implementation of the statute and Superfund provided the funding for the beginning of an extensive consulting industry (OTA, 1989).

The new Superfund, known as SARA (Superfund Amendments and Reauthorization Act) is a five year extension of the law with a price tag of $8.5 billion. It contained the following:

1. A 10-fold increase in the tax on petroleum, and the imposition of a new tax on corporations;

2. A series of strict deadlines for initiating cleanup actions;

3. A set of more stringent cleanup standards to assure the protection of health and the environment, and to emphasize permanent remedies;

4. A research program to study the health effects of hazardous substances, and a requirement that health assessments be performed at all NPL sites;

5. A program to accelerate cleanups at federally owned hazardous waste sites;

6. A procedure to facilitate settlements between EPA and responsible parties;

7. A program for extensive involvement by the states in the cleanup process;

8. A broad new research and development authority;

9. A new fund to finance the cleanup of leaking underground storage tanks;

10. A separate program requiring facilities that use hazardous substances to make certain information available (Community Right-To-Know); and,

11. A program to require state, local, and regional planning for hazardous substance emergencies.

Superfund is an extremely complicated process. The program is now divided into short-term 'removals' to mitigate emergency situations, and long-term 'remedial actions' to clean up sites considered serious enough to be placed on the National Priority List (NPL).

To be placed on the NPL, a 'preliminary investigation' of an identified site is conducted. If it is determined that a site investigation is warranted, the site is ranked against a specific set of criteria as established in CERCLA. If a sufficiently high rank is achieved, the site is placed on the NPL. The ranking is an arbitrary criteria established by EPA. [18]

The sites identified for the 'preliminary investigation' are not located in a systematic fashion, but are identified based on subjective criteria. Politics has obviously played a big part in which sites have been investigated.

Once a site is listed, a detailed 'remedial investigation' (RI) is conducted. The RI phase is designed to study the broad range of clean-up options currently available. The next stage is a 'feasibility study' (FS) to examine the cleanup alternatives in terms of costs and appropriateness to the site. These are often conducted simultaneously. However, when the RI/FS is conducted it often really doesn't consider all of the clean-up alternatives available, because of the focus on cost.
In announcing its decision, EPA issues a document called the 'Record of Decision' (ROD). The ROD is a report on the determination made on the site by EPA and contains information of which alternative they have chosen to pursue. It generally does not contain the alternatives that they have chosen not to study. The Army Corps of Engineers generally oversees the actual design and construction work of the remedial action.

The Superfund law intends that those responsible for the contamination should pay for the cleanup (Reisch, 1988). The SARA amendments made that financial responsibility more stringent.

Progress to Date

Two recent reports, one from the Congressional Office of Technology Assessment entitled "Are We Cleaning Up - 10 Superfund Case Studies" and the other representing the combined investigative work of industry and the environmental community entitled "Right Train, Wrong Track: Failed Leadership in the Superfund Cleanup Program," have come to similar conclusions... that EPA continues to manage Superfund in a way that is "largely ineffective and inefficient" (OTA, 1988).

The combined industry/environment study reviewed the first full year of SARA (75 RODs) in 1987 and reported the following:

> "EPA's selection of remedies and cleanup levels (for 1987) were virtually indistinguishable from the flawed decisions which plagued the early years of the program".
>
> and
>
> "Current cleanups repeat past failures by simply capping and containing hazardous material on-site. (Right Train.., 1988)."

The report goes on to state that EPA ignored existing environmental standards, set cleanup goals unscientifically, and exempted Superfund cleanups from the very environmental regulations it imposes on other hazardous waste management facilities (like hazardous waste land disposal restrictions and liner requirements for landfills). EPA also ignored the impact of Superfund sites on natural resources in the vast majority of cases.

The report concluded that the (Superfund) program "falls far short of that necessary to protect human health and the environment from the dangers of Superfund sites" (Right Train..,1988).

Another OTA report issued in October, 1989 entitled "Coming Clean, Superfund Problems Can be Solves," criticizes EPA's reliance on negotiated settlements to fund clean-up projects and maintains that this has resulted in incomplete and unsafe remedial actions. (OTA, 1989b).

V. GROUNDWATER IN CALIFORNIA

In California, nearly 18 million people, approximately 69% of the population, rely on groundwater for their primary drinking water. Additionally, about 40% of California's agricultural needs are met by groundwater. Of 461 groundwater basins in California identified by the Department of Water Resources (DWR), 248 are considered significant sources of drinking water (USGS, 1988).

From 1984 to 1985, 139 [19]of the usable groundwater basins were surveyed for water quality by California State Water Resources Control Board. The survey showed that 14% of the basins would support only partial use. Groundwater of poor quality was found in all or part of 21 basins (USGS, 1988). Except for Fresno County, which had 1,052 wells which exceeded State Action levels, [20]Los Angeles County had the highest number of wells yielding contaminated water (USGS, 1988) [21]. EPA has placed thirty-four California hazardous waste sites on the National Priority List (NPL) of Superfund (CERCLA). In addition, the California Department of Health Services has placed an additional 120 sites on the State toxic substance priority list (USGS, 1988).

Groundwater contamination from organic solvents, pesticides, acids and trace metals have been detected at 26 of the 34 California sites on the NPL.

Agricultural practices in California contribute substantially to the groundwater contamination problems. There are 9.5 million acres of irrigated land in the state, growing nearly 200 commercial crops. Most of these crops are heavily fertilized and have large quantities of pesticide applied to them. Dibromochloropropane (DBCP) [22] is the most widespread pesticide found in California groundwater. Of 8,190 private and public wells tested from 1979 to 1984, 2,522 wells had some DBCP contamination and 1,455 exceeded the proposed State Action Level of .1 part per billion (ppb) [23] [24] (USGS, 1988). While the pesticide regulations are very stringent in California, compared to other states, their enforcement is quite lax. The state agriculture department, which sees as its primary mission 'helping' agriculture, uncovered 9,287 pesticide violation last year and they investigated 3,122 additional reports of possible pesticide poisoning. Of the violations, only 600 resulted in fines, and just 18 were referred to local district attorneys for possible legal action (Nazario, 1989).

More than 50 wells have been closed in Los Angeles County as a result of the byproducts of industrial activity. The five most commonly detected chemicals are: tetrachloroethylene (perchloroethylene or PCE), trichloroethylene (TCE), carbon tetrachloride (CTC), chloroform, and 1,1-dichloroethylene (1,1-DCE). These are used primarily in industrial and manufacturing processes (USGS, 1988)

Hazardous waste is dumped at 71 permitted sites throughout California. Even though these sites have Resource Conservation and Recovery Act (RCRA) approved interim toxic waste disposal permits, EPA indicates that monitoring at these sites is incomplete and that the groundwater situation at these sites is 'unknown' (USGS, 1988).

The use of injection wells has gained limited acceptance in California (TAG, 1985). Five injection well sites in California are so badly contaminated that they appear on the state SuperfundList. No state or federal regulatory agency has conducted a thorough statewide survey for hazardous waste injection wells and, therefore no agency can even estimate the potential for groundwater contamination from these sources, and how many will wind up as new Superfund sites.

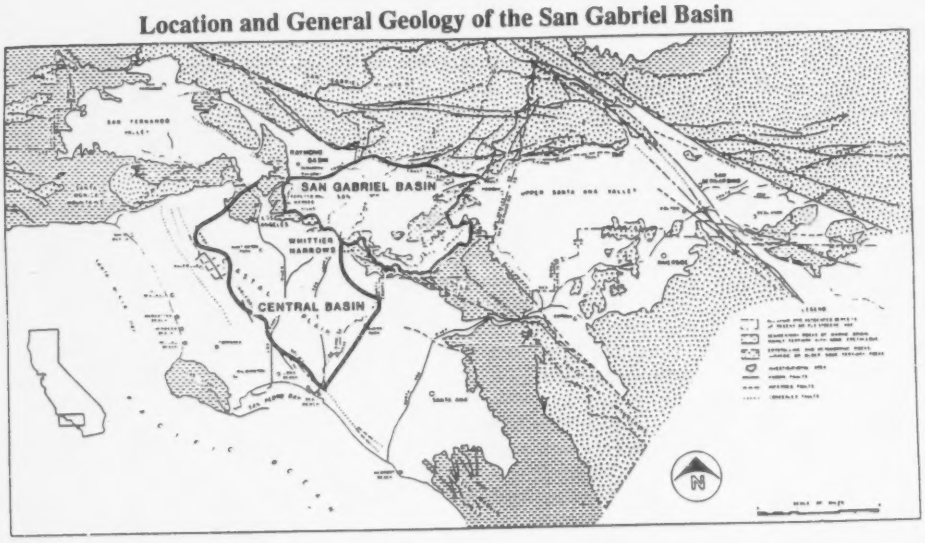
In fact, California has a long history of environmental problems associated with Superfund. The Stringfellow project is an example of a Superfund nightmare which had long-term political implications for EPA. Almost all of the Superfund sites in California have groundwater contamination or potential for contamination.

VI. GROUNDWATER: SAN GABRIEL VALLEY - A CASE STUDY OF INACTION

The San Gabriel Valley is located approximately 10-20 miles northeast from downtown Los Angeles in Los Angeles County. It is nestled between the San Gabriel Mountains on the north, the Verdugo Mountains on the west and the San Jose Hills on the east and south. It is home to almost two million people, from Passadena and Alhambra on the west to Covina on the east (see Figure 1).

Figure 1

Location and General Geology of the San Gabriel Basin

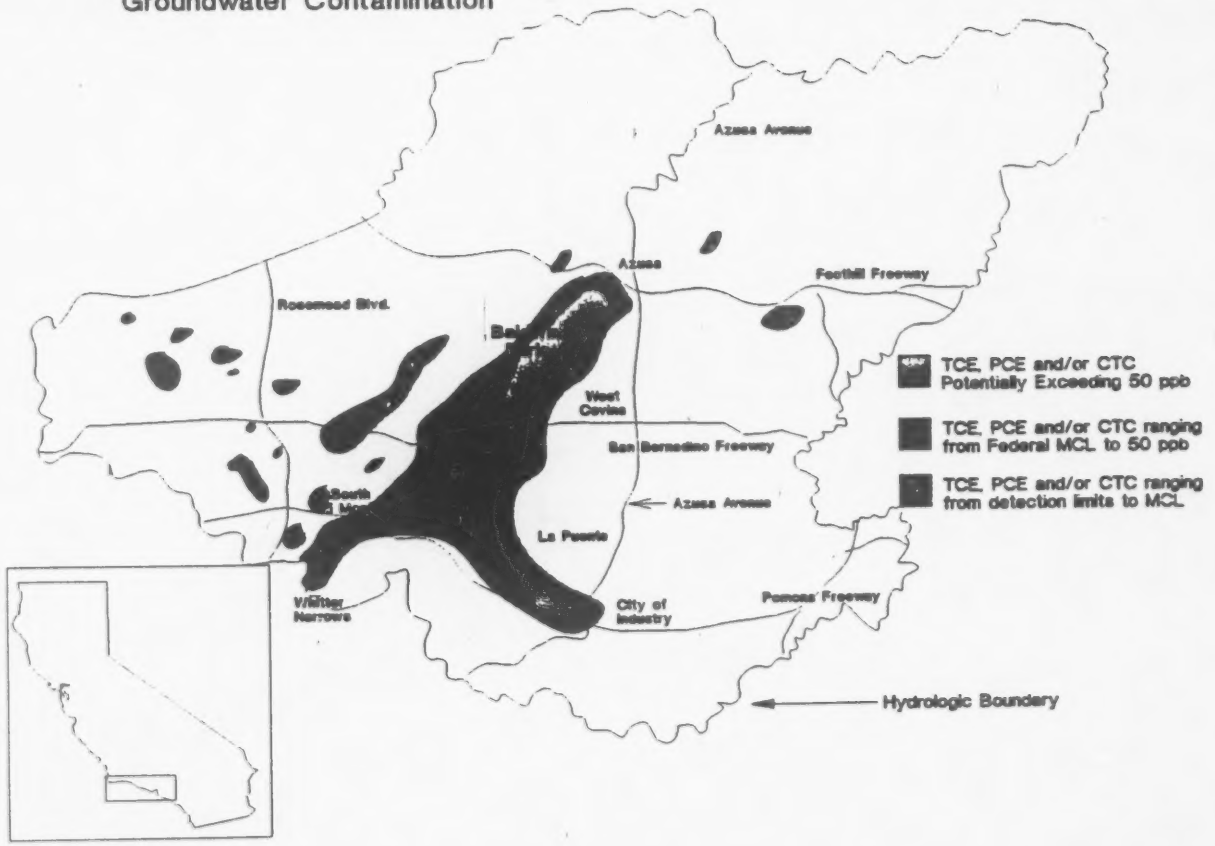


The main San Gabriel Valley Groundwater basin (Figure 2), which underlies the San Gabriel Valley, consists primarily of highly permeable gravel and cobble deposits. It provides 200,000 acre feet[25] per year of water to over one million residents. Estimates of regional groundwater flow velocities range as high as 1000 feet per year. The water ranges from 150 - 300 feet below ground in the northern part of the Valley to only 20 - 50 feet below ground in the Whittier Narrows and La Puente Valley. The aquifer depths are up to 3,000 feet. Groundwater flows generally in the same pattern as surface water, although in some areas of the Valley, large-scale pumping has resulted in a reversal of the groundwater flow (EPA, 1988). The groundwater discharges towards the southern portion of the basin where it drains into the Central basin at Whittier Narrows (see Figure 2).

Since its conversion from agricultural use during World War II, the San Gabriel Valley has experienced rapid industrial, commercial and residential development. The San Gabriel Groundwater Basin provides over 90% of the water supply for a population of over one million. Forty-five different water purveyors extract water from the basin, as do many additional commercial and industrial users (EPA, 1988).

San Gabriel Basin

Groundwater Contamination



In the San Gabriel Valley, groundwater contamination by volatile organic compounds (VOC) was first detected in December 1979. At that time, Aerojet Electrosystems in the City of Azusa sampled a nearby groundwater well owned by the Valley County Water District and found 1800 ppb of TCE. [26] Subsequent sampling by the California Department of Health Services (DHS) and the Los Angeles County Department of Health Services identified over 50 wells contaminated with TCE, PCE, and/or CTC, in the San Gabriel Groundwater Basin at concentrations above the state action levels.

A plume of contaminated water will migrate and spread depending on the such factors as the local flow patterns, density of contaminant, and character of the aquifer. As can clearly been seen in Figure 1, there is not one but many different contaminant plumes in the San Gabriel Valley and indications are that they are all moving at different rates.

Since initial detection of the contamination in 1979, EPA and DHS have been carefully monitoring the water quality. Nine years later, the sampling data continues to detect volatile organic compounds, including TCE at exceedingly high rates. Evidence presented by EPA in the 1988 Record of Decision for the Bartolo Well Field shows that the contamination levels of the volatile organic compound TCE have reached 1100 parts per billion (ppb) in some wells. This represents no significant decrease in amount of contamination nor in the number of wells effected. This 1988 testing data of 407 wells clearly demonstrates that the water is as contaminated as it was in 1979 and that the natural groundwater system does not have the ability to cleanse itself in the short-term.

By law, the local water purveyors are prohibited from supplying contaminated water. Therefore, when the contamination was discovered, the water supply companies had to make some decisions about how they were going to continue to provide clean water to their suppliers. By a combination of shutting down the most contaminated wells, drilling deeper wells, blending water from contaminated wells with water from clean wells, and by low-tech (aeration) treatment of contaminated water, all except three small water purveyors in the city of El Monte (Richwood, Rurban and Hemlock) were able to provide their customers with water within the state guidelines. The water customers absorbed the additional costs of these measures.

The federal government became involved when the four areas of groundwater contamination in the San Gabriel Valley were proposed for inclusion on the (NPL) National Priorities List (Superfund) in September 1983. These areas were finalized on the NPL in May 1984. The State of California became involved through the formation of the San Gabriel Valley Management Committee. The committee [27] was organized by DHS in 1983 to coordinate the remedial action necessary to preserve the groundwater quality of the Valley. The inability of the three mutual water companies to provide water within federal and state guidelines was the initial focus of both federal and state activities. The San Gabriel Valley Management Committee established three goals:

1. Take immediate action to supply the three mutual water companies in El Monte with a clean water supply;

2. Identify the source or sources of groundwater contamination in order to prevent further degradation; and

3. Develop a long-term strategy for remedial action.

EPA hired a consultant to prepare a focused feasibility study (FFS) to evaluate interim remedial measures (IRM) to solve the water quality problems of the three mutual water companies in El Monte. The FFS was released in December 1983 and a Record of Decision (ROD), selecting air stripping as the appropriate remedial action, was signed in May 1984 (See Figure Three).

The consultants hired by EPA to perform the FFS, however, failed to take into consideration certain problems associated with these mutual water companies. The consultants apparently never conducted an on-site evaluation, nor did they consider whether the companies were capable of operating the complicated airstripping system that was being recommended. In addition, the original FFS failed to evaluate the fact that the mutual water companies operate without reservoirs. The companies have equipment which varies the flow-rate, depending on demand, requiring that the system is continually being turned-on and off depending on demand. Constantly being turned on and off could cause serious mechanical problems for the air stripping tower. To operate efficiently, and air stripping tower requires a uniform rate of water flow over time.

A pre-design study was then initiated, which led to substantial revisions to the cost estimates for the various alternatives presented in the FFS. The consultant for this project was the same as the consultant who prepared the original flawed FFS. Based on these revisions, EPA proposed in October 1986 to revise its decision and, instead of the air stripping tower, install carbon adsorption treatment systems for the water companies. In September 1987 an amendment to the ROD was signed, designating the carbon adsorption system.

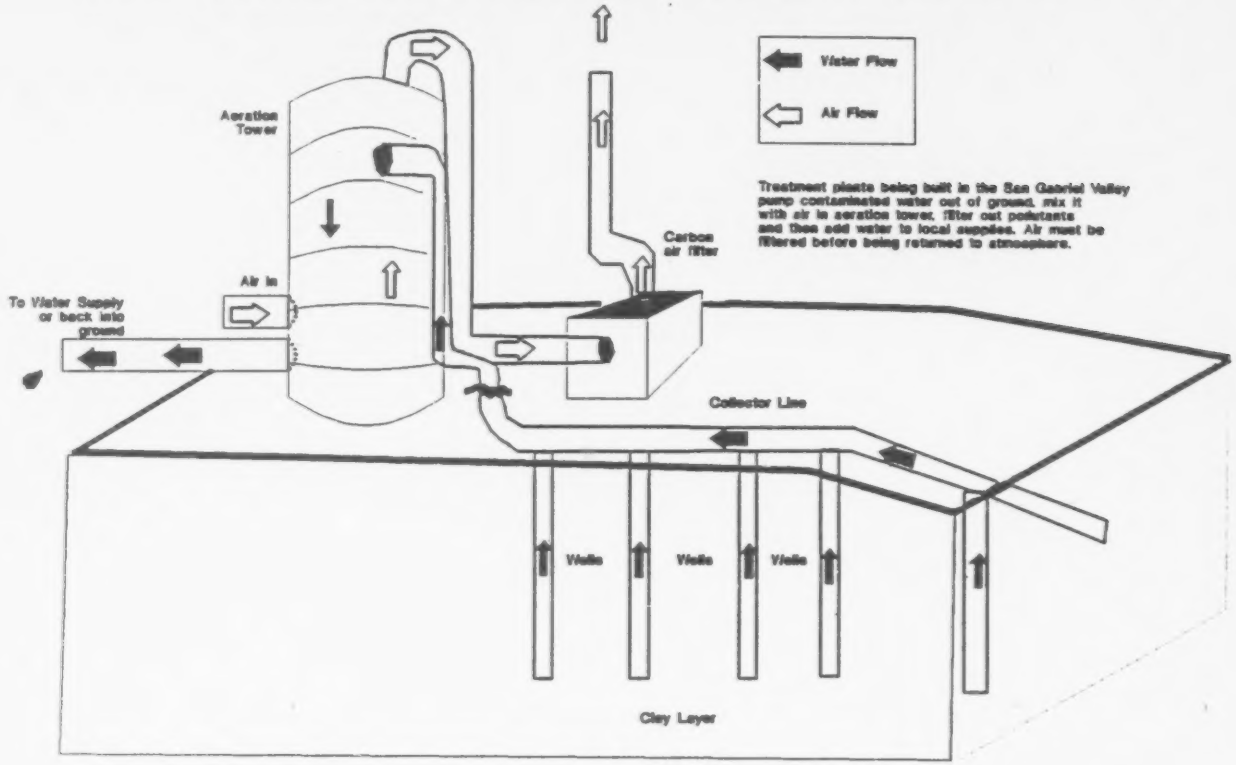
In March, 1989 the construction was completed for a carbon absorption system for Richwood Mutual Water Company. However, the system is currently not being operated because both EPA and its consultants failed to tell Richwood Mutual that it would have to install a backup water supply system. The estimated cost for the backup water supply system is $12,000.

A system was designed for Rurban Homes Water System, but its contamination levels fell below the state action levels, so the project was cancelled. The third mutual water company, Hemlock, decided that they couldn't afford to wait for EPA. They ultimately declined assistance from EPA and installed a carbon absorption system on their own.

To address the second management objective of identifying the sources of the contamination in order to prevent further degradation, EPA and the California Regional Water Quality Board, Los Angeles Region (RWQCB) have conducted several activities over the past eight years to identify the source of the groundwater contamination in the San Gabriel Valley. In August 1983 and January 1984, EPA issued 88 information requests under the RCRA law to facilities suspected of being major users of chlorinated solvents. The information requests were generated as a result of an investigation begun in 1980 by the RWQCB. From the responses to the information requests, 49 facilities were identified as potential 'Primary Responsible Parties' (PRPs). Investigations were conducted on these facilities in 1986-1987. In 1987 and 1988 EPA issued information request letters to an additional 208 facilities in the Baldwin Park/Azusa area. They also identified 12 'high priority' sites from the original list of 88.

In 1986, the RWQCB began a new source investigation program called the AB 1803 Follow-up

How Contaminated Ground Water is Treated



Treatment plants being built in the San Gabriel Valley pump contaminated water out of ground, mix it with air in aeration tower, filter out pollutants and then add water to local supplies. Air must be filtered before being returned to atmosphere.

Program. Under this program an area (generally one square mile) surrounding a contaminated well isestablished within which an intensive survey is conducted. Site inspections are conducted at all facilities potentially using solvents. Facilities that may have had toxic chemical releases are requested to perform a leak detection survey at their facility. If soil contamination is found, a more extensive groundwater investigation is required. As of September 1988, 60 facilities have been requested to conduct the groundwater investigation in the El Monte, La Puente and City of Industry areas. EPA has recently decided to augment the funding for the RWQCB program, which they consider successful.

In pursuit of the third management objective, to develop a long-term strategy for remedial action for the San Gabriel Valley, EPA decided to combine all four of the San Gabriel Valley sites as part of the Remedial Investigation/Feasibility Study (RI/FS). All the areas of contamination are located in one hydraulically-connected basin. EPA felt that actions to affect contamination in one of the Superfund sites might seriously affect contamination in nearby sites.

Taking all four sites together, EPA began a preliminary investigation in 1984, called the Supplemental Sampling Program (SSP). In all, this program, which was completed in May 1986, included the sampling of 70 existing groundwater wells for a full range of organic chemicals. Also included in the program was the collection and evaluation of existing data, and the modeling of regional groundwater flow. This information was combined with data provided by the water purveyors under California Assembly Bill 1803, and by the Department of Health Services (DHS). A total of 195 wells were ultimately sampled in 1985.

The key findings from EPA's SSP investigation were:

1. Volatile Organic Compounds (VOCs) are the only major organic contaminants affecting public water supplies in the basin.

2. Contamination has been found to a depth of 500-700 feet and the areas of contamination were much larger then previously thought. Up to 1/3 of the historic groundwater production is effected.

3. Potential exists for very rapid transport of contamination and ultimately a significant threat exists that wells which are currently clean will become contaminated.

4. Responses from the individual water purveyors may worsen the problem.

5. If the contamination in the San Gabriel Valley continues and additional wells are shut down, serious demands will be made on other water sources. There will be an increase in the demand for surface water.

EPA's consultants conducted computer modeling as part of the Supplemental Sampling Survey (SSP) which was released in May 1986. The results indicate that 36 wells were threatened with ontamination within five years if the plume continues to migrate at the same rate and direction as the regional groundwater flow.

The water purveyors who owned the threatened wells were contacted by EPA and notified of the threat. At same the time that EPA was conducting its modeling, one water company, Suburban Water Systems, contacted EPA on its own and expressed apprehension about the quality of their water supply.

Of the 36 wells identified as threatened, four wells belonging to Suburban Water Systems, were selected in March 1987 for an Operable Unit Feasibility Study (OUFS). These four wells are located in the Bartolo Well Field in Whittier Narrows. EPA seems to have ignored the remaining 32 threatened wells with the selection of the four wells at Bartolo since no mention is made of the remaining wells and why it was determined to ignore the contamination threat to them. According to EPA, the Suburban Water Systems wells were selected as a study site for the following reasons:

1. There is some evidence of contamination at this site;

2. These wells are located directly downstream from the principal contamination plume; and

3. Whittier Narrows is where the San Gabriel Groundwater Basin discharges into the Central Groundwater Basin.

The consultant designated to perform the OUFS was directed only to evaluate alternatives that might address the public health threat posed by contamination of the Bartolo Well Field, as well as evaluating the role that extraction of contaminants at that site could play in controlling contaminant migration in the Whittier Narrows area. This left unevaluated the issue of whether this was the correct action in light of the threat to the 32 other wells.

On June 22, 1988, the draft OUFS was released for public comment. In September, 1988 EPA announced its intention to build two air stripping towers at the Bartolo Well Field. According to EPA's Record of Decision (ROD), the Suburban Water Systems Bartolo Well Field was selected as a location for air stripping towers for two reasons:

1. To partially control the movement and spread of contaminants in the Whittier Narrows area of the San Gabriel Valley, thereby contributing to aquifer restoration at the San Gabriel Valley Areas 1, 2, and 4 sites; and,

2. To address the potential public health threat posed by contamination of the SWS's Bartolo Well Field (EPA, 1988).

In addition to the cleanup project planned at the Bartolo Well Field, EPA has issued an OUFS for an additional project in the Whittier Narrows area. This is expected to consist of five air stripping towers, designed with the objective of preventing any water, contaminated or not, from being discharged into the Central Basin without first having been treated. It is expected that the ROD for this next project will be issued in September, 1989.

In a field hearing conducted by the House Small Business subcommittee on Environment and Labor, held in the San Gabriel Valley in June, 1989, EPA announced the development of a comprehensive Basinwide Technical Plan. According to the representative of the Agency, the plan would be available in July 1989. However, shortly after the hearing the Agency revised its estimate and announced

that the Plan would not be available until December, 1989. In November, 1989 EPA announced that, because of the earthquate, the report wouldn't be available until the end of January, 1990.

However, it is EPA's announced intention of focusing next on the Azusa/Baldwin Park area of the San Gabriel Valley no matter what the report says. It is in the Azusa/Baldwin Park area that the initial contamination was first discovered in 1979 (Garber, 1988). This area still has the worst contamination levels. However, according to EPA, they will not be able to even begin the design phase of that part of the project until after 1990 because EPA has allocated the available funds elsewhere.

The following Time Line (Table 4) indicates the activities of EPA as they relate to the San Gabriel Valley.

CONCLUSIONS

Almost ten years have passed since Aerojet first reported groundwater contamination at levels 360 times the allowable State Action Levels. As of January 1989, not one drop of water in the San Gabriel Valley groundwater basin has been cleaned up as a result of EPA efforts. To date EPA has spent between $5 and $8 million. [28] [29]

With the September 1988 Record of Decision it would seem, that EPA has begun to seriously address the San Gabriel Valley contamination problem. However, in looking at the ROD closely it becomes apparent that the Key Finding of EPA's Supplemental Sampling Program (SSP) have been largely ignored. The single option which EPA has chosen of protecting the Central Basin and not cleaning up any contamination in the San Gabriel Basin does not address the following:

Key Finding 2 : That up to 1/3 of the historic groundwater production is effected;

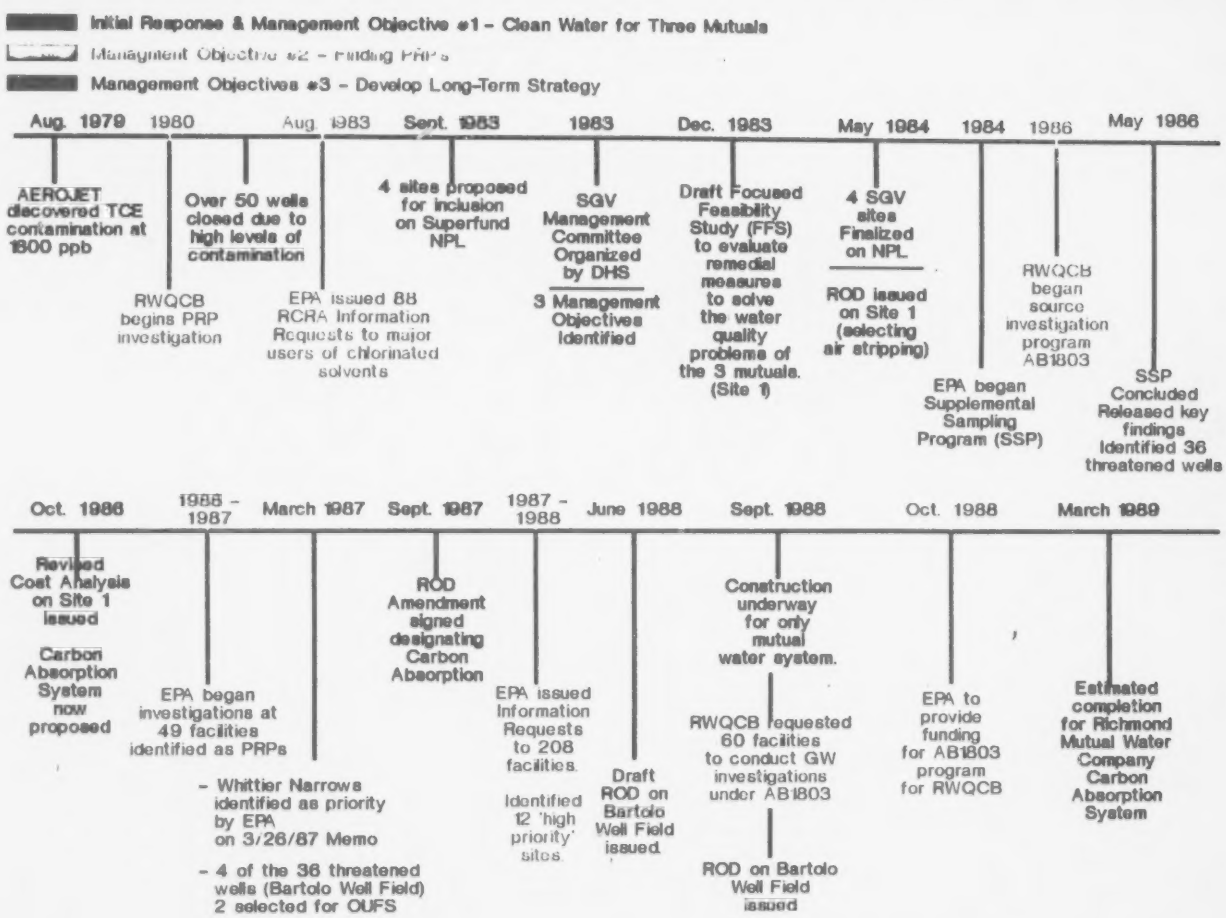
Key Finding 3: That a significant threat exists that other wells (besides the Bartolo Well Field) will become contaminated;

Key Finding 4: That responses from the individual water purveyors may worsen the problem;

and,

Key Finding 5: That if the contamination in the San Gabriel Valley continues and additional wells are shut down, serious demands will be made on other water sources. There will be an increase in the demand for surface water.

It is not apparent from the evidence in the ROD that the remedial action proposed for Whittier Narrows (Bartolo Well Field Project) is, in fact, the best approach for beginning to save the San Gabriel Valley Groundwater Basin. EPA's decision not to directly attack the groundwater contamination in the San Gabriel Groundwater Basin could lead to the conclusion that the Federal Agency charged with the responsibility of cleaning up the contamination in the Basin has determined that either such a cleanup isn't possible or that the Basin isn't worth cleaning up.
The following are some major criticisms of the foundation on which EPA based its decisions. According to the ROD, the Bartolo Well Field Project was chosen because:


Initial Response & Management Objective #1 - Clean Water for Three Mutuals
Management Objective #2 - Finding PRP's
Management Objectives #3 - Develop Long-Term Strategy
Aug. 1979
AEROJET discovered TCE contamination at 1800 ppb
1980
RWQCB begins PRP investigation
Over 50 wells closed due to high levels of contamination
Aug. 1983
EPA issued 88 RCRA Information Requests to major users of chlorinated solvents
Sept. 1983
4 sites proposed for inclusion on Superfund NPL
1983
SGV Management Committee Organized by DHS
3 Management Objectives Identified
Dec. 1983
Draft Focused Feasibility Study (FFS) to evaluate remedial measures to solve the water quality problems of the 3 mutuals. (Site 1)
May 1984
4 SGV sites Finalized on NPL
ROD issued on Site 1 (selecting air stripping)
1984
EPA began Supplemental Sampling Program (SSP)
1986
RWQCB began source investigation program AB1803
May 1986
SSP Concluded Released key findings Identified 36 threatened wells
Oct. 1986
Revised Cost Analysis on Site 1 issued
Carbon Absorption System now proposed
1986 - 1987
EPA began investigations at 49 facilities identified as PRPs
March 1987
- Whittier Narrows identified as priority by EPA on 3/26/87 Memo
- 4 of the 36 threatened wells (Bartolo Well Field) 2 selected for OUFS
Sept. 1987
ROD Amendment signed designating Carbon Absorption
1987 - 1988
EPA issued Information Requests to 208 facilities.
Identified 12 'high priority' sites.
June 1988
Draft ROD on Bartolo Well Field issued.
Sept. 1988
Construction underway for only mutual water system.
RWQCB requested 60 facilities to conduct GW investigations under AB1803
ROD on Bartolo Well Field issued
Oct. 1988
EPA to provide funding for AB1803 program for RWQCB
March 1989
Estimated completion for Richmond Mutual Water Company Carbon Absorption System

Leaching -
Removal of materials in solution from soil, rock, or waste. Maximum Contamination Level (MCL) - The maximum permissible level of a contaminant in water at the tap. These are health related and legally enforceable. If these concentrations are exceeded or if required monitoring is not performed the public must be notified Mineralization - Increases in concentration of one or more constituents as the natural result of contact of groundwater with geologic formations.

Narrative Water Quality Standards -
These standards, while not listing a specific maximum contamination level, may give a general description of 'all toxics harmful to humans or animals', etc.

National Priority List (NPL) -
A list of sites across the country slated for EPA enforcement action or cleanup.

Non-point Sources of Pollution -
Pollution from broad areas, such as fertilizer and pesticide application and leaking sewer systems, rather than from discrete points.

Numeric Water Quality Standards -
These standards use Maximum Contamination Levels (MCL) to establish the total allowable concentration of a chemical that an individual may consume. These standards are intended to be "tap water" standards.

Overdraft
(Groundwater) - When water is pumped in excess of the natural ability of the groundwater system to recharge itself. Point

Source of Pollution
Originating from any discrete source, including, but not limited to, the outflow from a pipe, ditch, tunnel, well,concentrated animal-feeding operation, or floating craft.

Polluted Water -
Groundwater is considered polluted when the contamination levels are such that the water is rendered unfit for human consumption.

Pollution Plume -
Area of degraded water in a stream or aquifer resulting from migration of a pollutant. Plumes are influenced by such factors as the local groundwater flow patterns, density of contaminant, and character of the aquifer.

Potentially Responsible Parties (PRP's) -
Those identified by EPA as potentially liable under CERCLA for Cleanup costs. PRPs may include generators and present or former owners/operators of 58 certain facilities or real property where hazardous wastes have been stored, treated, or disposed of, as well as those who accept hazardous waste for transport and selected the facility.

Radionuclides -
Species of atom that emit alpha, beta, or gamma rays for a measurable length of time. Individual radionuclides are distinguished by their atomic weight and atomic number.

Recharge -
(Groundwater) - Process of addition of water to the groundwater system by natural or artificial processes.

legally enforceable but are regarded by most water suppliers as having the same force as Maximum Contaminant Levels (MCLs) established by government regulations.

Superfund -
(see CERCLA)

Toxic Substance Priority List -
California Superfund list.

Unconfined Aquifer
Aquifer whose upper surface is a water table free to fluctuate.

Underground Pressurized Injection -
A well used for injecting fluids into an underground stratum below the depth of usable groundwater supplies. A well consists of three main parts: multiple casings cemented in the bore hole; an injection tubing, placed on a packed or fluid seal, which carries the waste to the injection zone; and a sealed, pressurized fluid in the space between the inner casting and the injection tubing, which is designed to detect leaks. Different wells inject to different depths depending on the nature of the wastes and the hydrogeology. 60 Volatile Organic Compounds (VOC's) - a group of lightweight, synthetic organic compounds, many of which are aromatic; sometimes referred to as "purgeable organic compounds" because of their low solubility in water. Volatilize - Passed off as gas.

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THE MAIN SAN GABRIEL GROUNDWATER BASIN

TIMOTHY C. JOCHEM
PROJECT MANAGER
MAIN SAN GABRIEL BASIN WATERMASTER

The Groundwater Basin

The Main San Gabriel Groundwater Basin is located on the Southern California Coastal Plain, approximately twelve miles east of downtown Los Angeles. The Basin covers approximately 170 square miles including the tributary watershed, and encompasses much of the San Gabriel Valley.

About 90% of water supply needs of the some one million people populating the San Gabriel Valley are met through utilization of the groundwater resource of the Basin. The remaining 10% is met through the direct delivery of treated surface water, either diverted from the local San Gabriel River or imported and supplied by the Metropolitan Water District.

The water supply and distribution facilities of the area are owned and operated by the Basin's 46 water suppliers, which include municipalities, mutual water utilities, privately owned water companies, and county water districts. A judgement by the Los Angeles Superior Court in 1972 adjudicated the groundwater resource of the Basin by establishing prescriptive water rights for water producers of the region.

The average annual yield of the Basin's 248 active wells is about 240,000 acre feet of water, or approximately 80 billion gallons.

The Basic Hydrogeology of the Basin

The Basin is situated within the highly permeable alluvial fan of the San Gabriel Mountains to the north. Simplistically described, the Basin is similar to a large bowl of sands, gravels and clays.

The Basin is basically homogeneous extending down to a depth of 4000 feet in the center. While the total Basin storage capacity is estimated as high as 8,000,000 acre feet, only the top 5% of this is utilized due to the limited natural recharge of the Basin.

Eighteen inches of average annual rainfall provides the source of natural recharge of the Basin. This occurs as precipitation on the Valley floor or as runoff from the local mountains that percolates downward to the water table.

Water Quality-Contamination

The favorable geologic environment that permits the existence of the groundwater resource of the area paradoxically renders the Basin highly vulnerable to contamination. As water percolates downward to the water table, surface born contaminants are transported with the water.

Extensive agricultural activities took place in the San Gabriel Valley from the 1920's through the 1960's. The use of crop fertilizers as well as leakage from septic systems provided excessive nitrogen to the soils, ultimately converting to nitrates. Initial discovery of the nitrate contamination of the groundwater occurred in the early 1960's.

While the nitrate contamination is confined primarily to the most shallow water bearing strata, approximately 30 wells have been deactivated in the Basin as a direct result of excessive nitrate concentration.

Because denitrification of potable water is generally considered non cost effective, the water producers have employed two basic strategies to address the nitrate problem. The first is to abandon shallow contaminated wells and replace them with deeper wells, avoiding the areas of the aquifer where nitrate contamination exists at the higher levels. Secondly, producers have blended moderately contaminated wells with wells having little or no nitrate contamination prior to delivery to their customers. Blending is an economical and dependable method reducing nitrate concentrations in drinking water supplies, although specific distribution system configuration requirements often preclude its application.

The occurrence of organic chemical contamination of the groundwater was first discovered in the Basin in 1980. The source of this contamination includes industrial discharges, leaking chemical storage facilities, illegal dumping, and landfills.

These problems have developed as business and industry developed in the San Gabriel Valley over the 40 years following World War II. The typically occurring organic chemicals are of the chlorinated hydrocarbon species, including the solvents and degreasers trichloroethylene, tetrachloroethylene, dichloroethylene, and carbon tetrachloride.

The generally low maximum contaminant levels for these chemicals in drinking water make relatively small releases to the environment potentially destructive. For example one gallon of tetrachloroethylene can render 100,000,000 gallons of water undrinkable.

To date, 80 wells in the Basin have exceeded drinking water standards for organic chemicals. About half of those wells have been deactivated. The other half are blended with uncontaminated sources, or have been equipped with treatment facilities.

Similar to the producers response to the nitrate problem, shallower contaminated wells have been replaced by deeper wells. Initially, this appeared to be a reasonable approach to the organic chemical contamination of the Basin. Currently however, our available data indicates this practice may actually serve to spread the contamination throughout the Basin more rapidly. Contamination has been recently confirmed as deep as 700 feet below the surface.

Presently, the estimated extent of organic chemical contamination in the Basin covers approximately 40 square miles (about 25% of the total Basin area). The Basin computer model indicates that in the immediate future the extent of contamination will continue to grow, covering an additional 15 square mile area and affecting 30 to 40 more wells. Consequently, without aggressive remediation activities, the contamination could conceivably impact every well within the Basin.

The United States Environmental Protection Agency first became involved in the organic chemical contamination problems of the Basin in 1983. The Basin was placed on the Federal Superfund Priority List in 1985. The E.P.A. has conducted extensive evalutation and analysis of the Basin's water quality problems and have constructed a treatment facility for a small mutual water utility in the El Monte area. Additionally, they have proposed the construction of groundwater treatment facilities at the lower boundary of the Basin to prevent the migration of the contaminant plumes to the adjacent groundwater basin to the south.

The E.P.A. has stated that a comprehensive clean up of the Basin may run as high as $800,000,000 and take decades to accomplish.

Impacts of Groundwater Contamination in the Basin

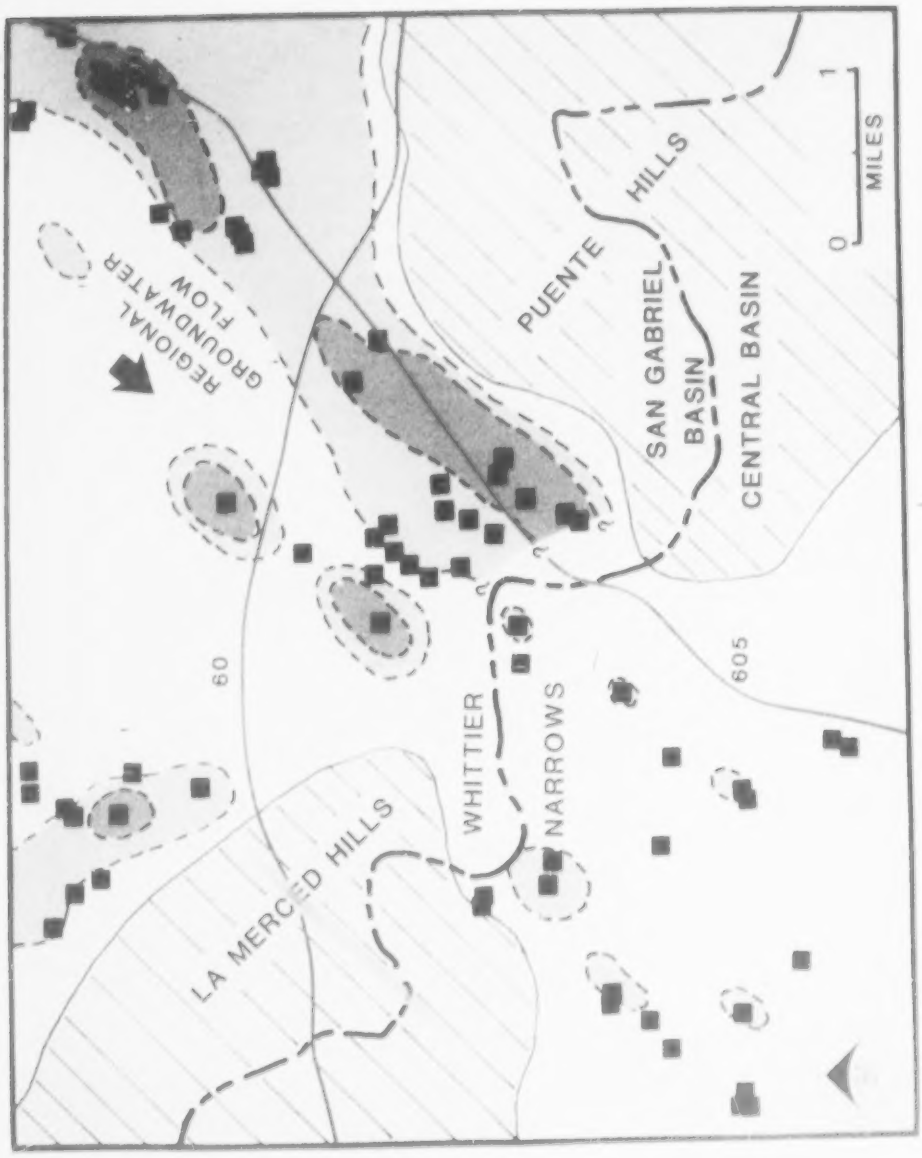
Although much of the drinking water supplies of the San Gabriel Valley exhibit quantifiable levels of organic chemicals and/or nitrates, all water served to the public presently meets drinking water standards. Health risk to the public from the drinking water supplies has been minimal.

Primarily, the impacts of the contamination to date have been essentially financial in nature. Assigning total dollar values are difficult although capital losses can be generally quantified. Typically, the present capital worth of the average production well is approximately $350,000 excluding the value of property on which it is sited. Therefore, capital losses to date for nitrate contamination can be estimated at $10,500,000, and capital losses from organic chemical contamination can be estimated at $15,000,000.

While capital losses do not directly impact water rates, the cost to cover the losses, such as replacing a deactivated well or adding treatment facilities, have and will continue to increase the cost the public pays for potable water service.

Additionally, any future costs for clean up of the groundwater basin not covered by responsible parties, federal, or State funding mechanisms, will be paid by the water utilities and ultimately by the public.

The potential risk to public health from ground water contamination in the Basin must not be under emphasized however. If substantial resources are not committed to Basin remediation, the problem will continue to escalate to the degree that significant public health risk becomes likely.


REGIONAL GROUNDWATER FLOW
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SAN GABRIEL BASIN
CENTRAL BASIN
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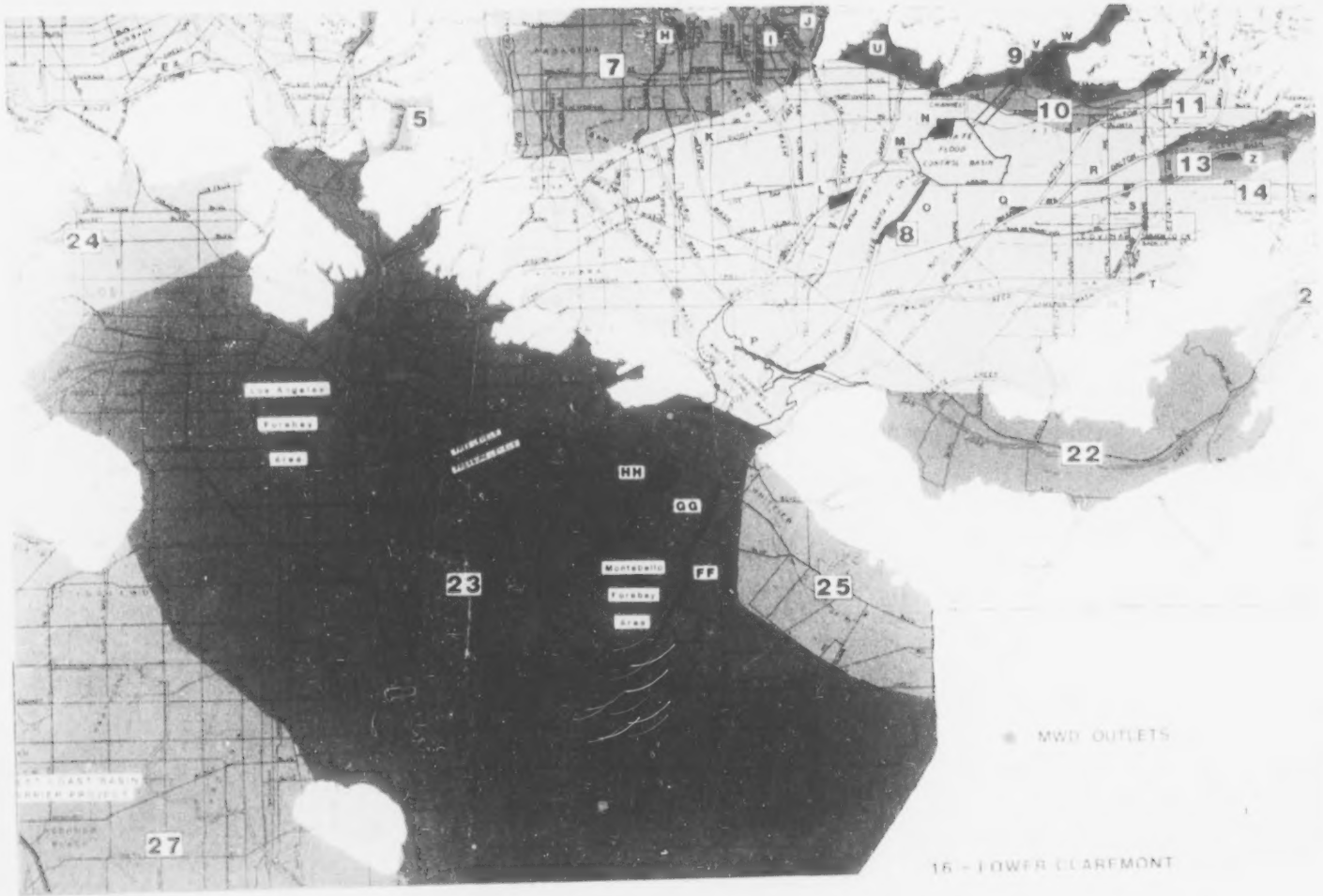
60
WHITTIER NARROWS
LA MERCED HILLS

SUMMARY OF CHEMICAL COMPOUNDS DETECTED AS A RESULT OF SAMPLING ACTIVITIES CONDUCTED IN 1985

	NO. OF WELLS EXCEEDING DETECTION LIMIT*	HIGHEST REPORTED CONCENTRATION (ppb)

Contamination Sources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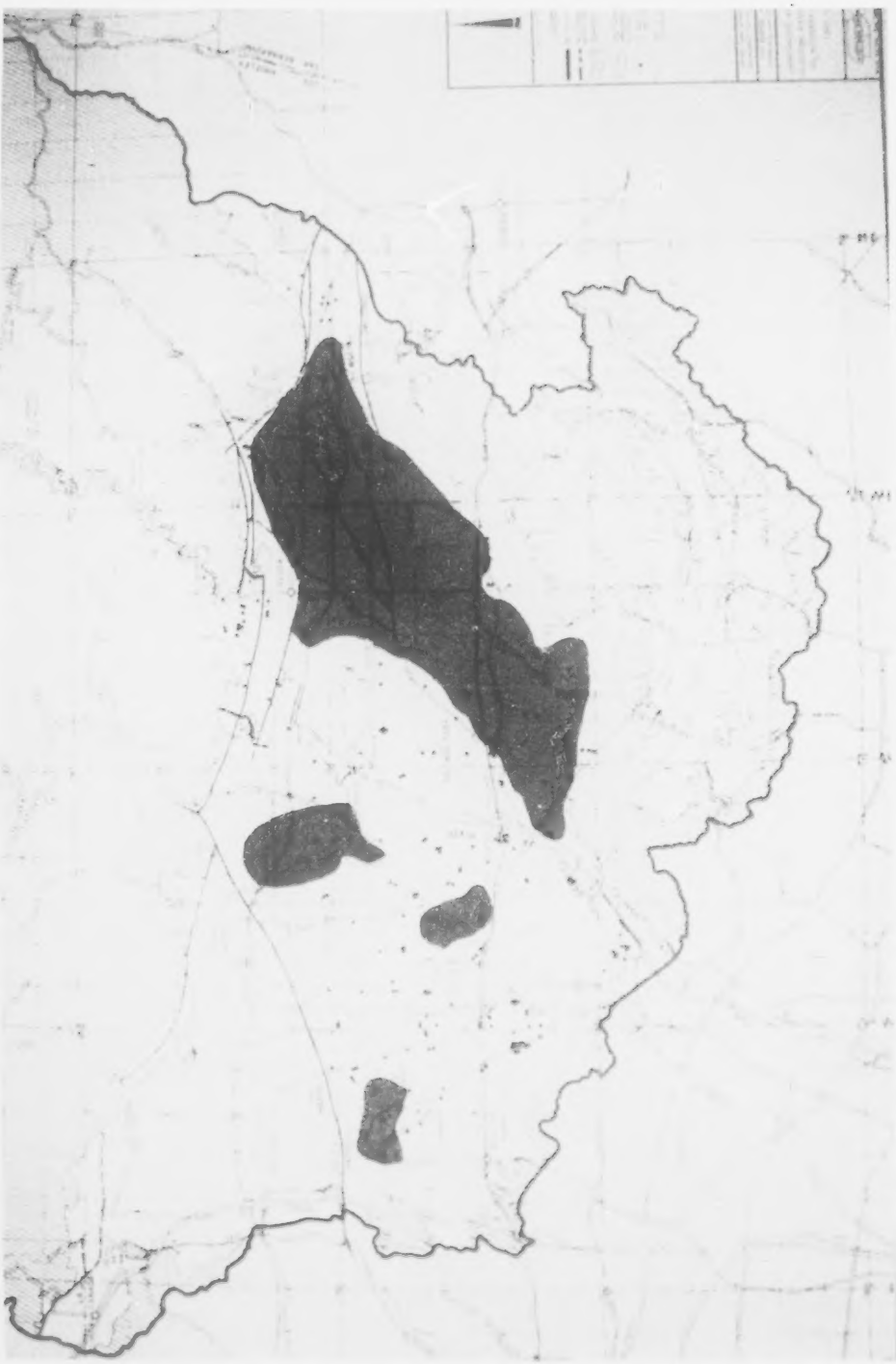
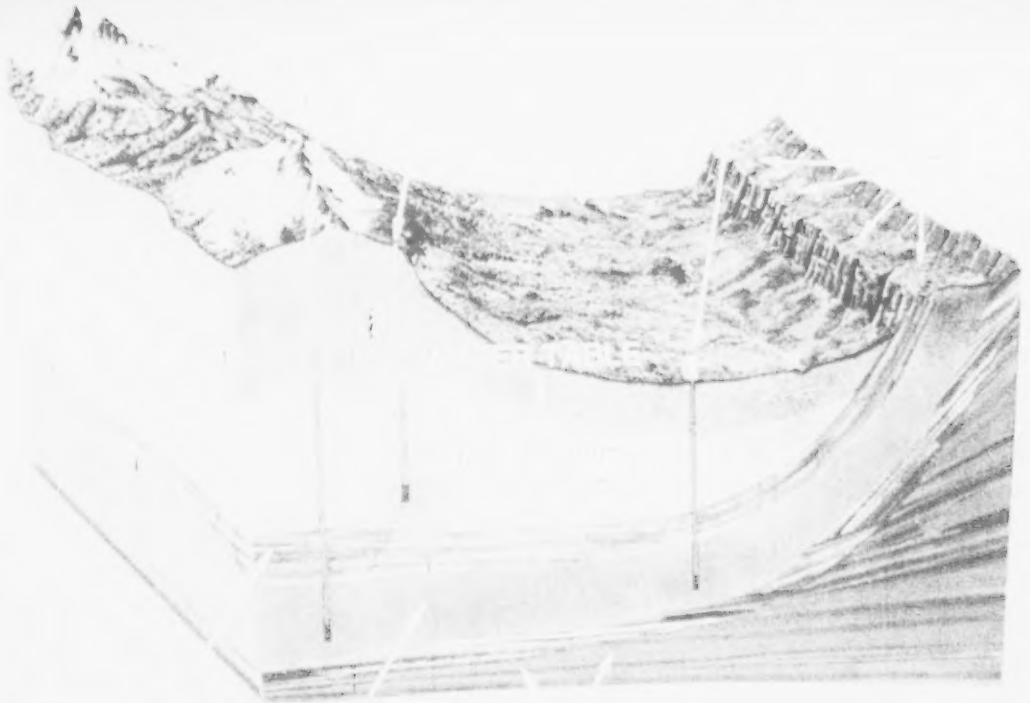


Contamination Sources

The Ground-Water Resource



STATEMENT OF
MARIAN MLAY
DIRECTOR, OFFICE OF GROUND-WATER PROTECTION
OFFICE OF WATER
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON ENVIRONMENT AND LABOR
COMMITTEE ON SMALL BUSINESS
UNITED STATES HOUSE OF REPRESENTATIVES

November 14, 1989

Good morning, Chairman Torres, and Members of the Subcommittee. With me today is Russel H. Wyer, Director of the Hazardous Site Control Division in EPA's Office of Emergency and Remedial Response in the Office of Solid Waste and Emergency Response and David B. Jones, Director of the Superfund Remedial Branch of the Hazardous Waste Management Division of EPA's Region 9 Office in San Francisco, California. We are pleased to be here today to discus Federal and State ground-water protection activities, and to review Federal Superfund activities at the San Gabriel Superfund sites.

Protecting ground water that serves as a source of drinking water from an unreasonable risk of contamination is important to protect public health. I would like to present our views on the complex nature of the resource and the contamination problem, and describe our current protection and cleanup actions under existing statutes. I will also review some basic principles which will form the basis for the Agency's ground-water efforts in the future as well as comment on the San Gabriel Valley.

CHARACTERISTICS OF THE GROUND-WATER RESOURCE

Ground-water protection poses significantly different problems than protection of surface water resources and air. The concentrations of contaminants released to ground water have much less opportunity to be diluted than does surface water. However, there are attenuating circumstances that can prevent contamination from reaching ground water or reduce the level of resulting contamination.

Ground water is not as easily monitored as are air and surface-water resources. Taking a ground-water sample may require drilling a well, and the information obtained may be significantly different from that collected a short distance away from the sampling point as ground water generally moves at a rate of inches per day, whereas surface water generally flows at a rate of feet per second.

Ground-water contamination is caused by the discharges from a wide variety and number of sources, including improperly managed underground storage tanks and hazardous waste landfills, agricultural practices, and septic tanks -- a community of countless large industries, small businesses, farmers, and individuals. For many sources, the principal protection comes from State or local governments adjusting local land use practices. In contrast, major gains can be made in protecting air quality and surface water by addressing a much smaller number of large sources.

Clean up of ground water is far more expensive and complex than surface water or air where merely stopping the pollution is a major clean up action.

THE GROUND WATER CONTAMINATION PROBLEM

It is important to consider several observations when discussing ground water contamination from a national perspective.

Until recently, ground water was generally considered to be a pristine resource. Experts and the public alike believed that the subsurface waters were self-cleansing and that human-induced contaminants were restricted to sewage. It is now known, however, that some ground water is contaminated by a variety of man-made as well as natural contaminants.

However, with respect to ground water contamination, we are in a fortunate position --we are not yet facing a national crisis of ground-water contamination, even though there are a number of serious local ground-water contamination problems. This means we have the opportunity to move at all levels of government, in the private sector, and in our communities to protect this resource from an unreasonable risk of contamination by preventing pollution rather than waiting to clean it up.

It is also clear that ground-water contamination is a problem that has greatly challenged the ingenuity and institutional capacity of government at all levels.

Further, it is clear that we need more data on the sources of contamination and their effects on human health and the environment. Because ground-water monitoring is very expensive and technically difficult, these data have been gathered only for selected contaminants or sources, and usually for a specific purpose. It will take time to fully appreciate the effect of these sources.

EPA'S STATUTORY AUTHORITY AND GROUND WATER PROTECTION EFFORTS

EPA conducts a wide variety of ground-water protection activities under our current statutory authority. These statutes control and clean up the most serious contamination sources and control the use of pesticides and toxic chemicals. For example, under the Safe Drinking Water Act (SDWA), EPA protects the public health by setting drinking water standards; we assist States in the protection of the water entering public water wells through the Wellhead Protection Program; and we control the injection of fluids into the underground. Under the Clean Water Act (CWA), we assist the States in developing and implementing State ground-water protection strategies.

Under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), we control the availability and use of pesticides that may present unreasonable risks to human health or the environment if they leach into ground water. Under the Resource Conservation and Recovery Act (RCRA), we control hazardous waste facilities,

municipal landfills, surface impoundments, and underground storage tanks and prevent their releases to ground water. Further, under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), EPA has authority to clean up historical and current releases of hazardous substances.

EPA GROUND WATER TASK FORCE

EPA has established a Ground-Water Task Force chaired by Deputy Administrator Henry Habicht and comprised of selected Assistant Administrators, Office Directors, and representatives from EPA's Regional Offices. The purposes of the Task Force are: to develop an Agency-wide strategy for the actions EPA will take in ground-water protection over the next five years, to establish the principles and objectives that will guide our future efforts, and to establish more effective relationships with other Federal agencies in carrying out our respective missions for protecting ground water.

While EPA's Ground-Water Task Force is moving forward to set an Agency agenda on ground water, the Agency continues to make significant progress in the protection and restoration of ground water. Since 1984, EPA has based its ground water efforts on the Agency's Ground-Water Protection Strategy, which Administrator Reilly believes continues to serve as a strong framework for the future. The Task Force is examining the experience under that Strategy and how we should move forward to protect ground water in

the future.

The basic principles established in the 1984 Strategy and which will continue to form our future efforts include the following.

First, we believe that States have a critical role in the protection of the ground-water resource as well as in the management of its use. The Federal government also has an important role as defined by statutorily mandated programs such as CERCLA, RCRA, FIFRA, CWA and SDWA. These include controlling the use of certain pesticides and toxic chemicals, setting flexible and protective standards for and cleaning up certain major sources of contamination, assisting States to develop the institutional capacity to manage their own efforts and providing technical assistance and research and development in support of management and protection efforts.

EPA has also supported State ground-water strategy development. Related new efforts, such as State Wellhead Protection Programs established under the Safe Drinking Water Act, help the States to focus their ground-water protection activities on the most high risk areas of the resource, those areas which feed into public drinking water wells.

Secondly, decisions about how to manage the resource need to take into account the use, value, and vulnerability of the ground-water resource. This approach allows the Agency to focus its resources and efforts and provides for greatest protection

where the greatest potential risk to human health and the environment is presented.

Thirdly, the Federal/State partnership efforts should be structured so that ground-water prevention efforts are enhanced. To implement this partnership, the Agency will focus on assisting comprehensive State ground-water protection programs, pollution prevention, technological innovations where feasible, and financial and technical assistance for the States, so that they can develop appropriate land use policies.

We know from the Superfund and RCRA corrective actions that the cost of cleanup is high relative to the cost of preventive actions that could have been taken. We believe that EPA and the States should give greater emphasis to prevention. States need to develop policies and take actions which will protect valuable ground-water resources from an unreasonable risk of contamination regardless of the types of sources of contamination in their State, using a mix of source controls, land use policies, and best practices.

GROUND WATER PROTECTION AND SMALL BUSINESS

To assure ground water is protected, EPA must help the States work with small businesses throughout the United States.

Through our regulatory programs, we work with small business to assure input during regulatory development and to assist small businesses to understand environmental requirements and to comply

with them. In fact, the Agency's Small Business Ombudsman assists small businesses to provide the input to the Agency's regulatory officials and to help small business to comply with regulations. All of our ombudsmen work closely with several hundred major small business trade associations to facilitate input into new regulations and to disperse information to the small business community when a regulation recommendation becomes final.

Through programs to assist State governments, such as through assisting with State ground-water strategy development and with Wellhead Protection Programs, EPA works to protect valuable ground water resources from sources of contamination from both large and small businesses. It is clear that small businesses must take an active role in protecting the ground water resource from contamination. And small businesses need to be involved in all aspects of State and local policy development and implementation.

THE SAN GABRIEL VALLEY AND GROUND WATER PROTECTION

Much of EPA's recent efforts have been focused on meeting the goal of containing the ground-water contamination within the San Gabriel Basin by controlling the migration of contaminants through the Whittier Narrows area and into the Central Basin to the south. In mid-July, 1989, we completed preparation of a preliminary draft of the Whittier Narrows Operable Unit Feasibility Study (OUFS), which identifies, develops, and evaluates potential remedial action alternatives to meet this goal. We have circulated this local

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report among interested state and local agencies for their review, as well as provided copies of the report to local community groups. After consideration of the input we receive, we plan to release a revised version of the OUFS report, along with EPA's proposed remedial action plan for Whittier Narrows area, to the public as part of a formal public comment period. This is currently scheduled to occur before the end of this year.

The other major focus of our recent efforts is in the development of a long-term management plan for the San Gabriel Basin. We have been working to prepare the San Gabriel Basinwide Technical Plan--a report that will outline a technical approach to remediation of the San Gabriel Valley's ground-water contamination problem. The approach will identify specific (1) remedial investigation activities that should be conducted to support the identification and development of remedial action plans, (2) proposed priorities for implementation of operable units in the San Gabriel Valley after the Whittier Narrows operable unit, and (3) source investigation activities to support enforcement actions to implement proposed operable units and to recover EPA's costs in planning and implementation of the first three San Gabriel Valley operable units.

EPA plans to have the Basinwide Technical Plan undergo an extensive review process by state and local agencies and the public to develop consensus on how to proceed with remediation of the contamination. When the report is released--currently planned for

late 1989--EPA will schedule several public workshops and agency briefings to provide information to explain the proposed technical approach, answer questions, receive input from the involved agencies and the public, and to foster an increasing level of cooperation among the agencies responsible for protecting public health and the environment of the San Gabriel Valley. In order to prepare the public for involvement in the review of the plan, we have recently distributed a fact sheet that provides a preview of the Basinwide Technical Plan and the technical approach that EPA is proposing.

In developing the Basinwide Technical Plan, EPA has identified a key institutional issue that must also be resolved at the state/local level to successfully implement the plan. This issue is the need for a single state or local agency to coordinate management of ground water in the basin from a water quality perspective. EPA's analysis of available data indicates that local ground-water pumping is a significant factor in influencing regional ground-water flows. Therefore, the successful control of migration of contamination within the basin will require the coordination of local pumping by purveyors and artificial ground-water recharge of surface water or reclaimed wastewater with the extraction, treatment, and use of contaminated ground water outlined in operable unit remedial action plans.

In addition, most facilities installed as part of the remedial action (e.g., extraction wells, treatment facilities, water

pipelines) can be considered "permanent" facilities for all intents and purposes, and will entail significant long-term operating costs (as well as potential replacement costs). Long-term operation of these facilities will be a state/local responsibility under SARA if participation of potentially responsible parties is not obtained.

There is currently no agency with the legal authority and technical resources to adequately "manage" the ground-water basin in this manner. At present, there is no control over the location and/or rate of ground-water extraction at existing or new production wells. Each of the over 40 water purveyors currently makes such decisions on their own, primarily on the basis of cost of production. Also, recharge of the basin occurs with essentially no consideration of the potential effect on the contamination problem. Unless new institutional arrangements can be created to address this problem, EPA will be unable to develop and implement the remedial action to protect human health and the environment of the San Gabriel Valley.

One of the nine criteria for selection of a remedy included in the draft National Oil and Hazardous Substances Contingency Plan is "implementability." Without new institutional arrangements, EPA may be unable to develop and select remedial actions that meet this criteria adequately. Thus, EPA may be unable to proceed with the implementation of necessary actions regardless of whether they are planned as fund-lead or enforcement-lead projects, unless state and

local government can resolve this institutional issue.

Finally, the magnitude and complexity of the San Gabriel remedial project will require a level of management commitment and financial support that can only be provided by a concerted-cooperative effort of state and local government along with the federal government. EPA is currently committing substantial resources to address this problem. If only EPA resources are committed, however, many important remedial actions will not proceed in a timely manner. As the project continues, other parties, including state and local agencies and the parties responsible for the contamination, will need to take on significant responsibilities if remediation of the ground water is to be achieved within a reasonable timeframe.

EPA plans to use the release of the Basinwide Technical Plan as an opportunity to begin discussions with state and local agencies and the public concerning the issues outlined today and to work toward development of an overall basin management plan that will describe how federal, state, and local government will work together to solve this large and complex problem. In the meantime, EPA will continue to implement appropriate remedial actions to the extent we can before an overall management plan is developed. Until the management plan is developed and implemented, however, EPA's implementation of the Basinwide Technical Plan will be greatly restricted for the reasons I have described.

EPA welcomes a discussion of any comments and concerns that will help us in our management of the San Gabriel sites.

CONCLUSION

Solutions to the problems associated with ground water will not be easy. As I have said, EPA has a new Ground-Water Task Force as well as continuing efforts under our current statutory authorities. Based on the efforts of the Task Force, we will look at the federal role in ground-water protection as well as whether we need to change our current statutory authorities.

Mr. Chairman, this concludes my testimony. I would be pleased to answer any questions from you or from the Members of the Subcommittee.

Working for the Nature of Tomorrow®

NATIONAL WILDLIFE FEDERATION

1400 Sixteenth Street, N.W., Washington, D.C. 20036-2266 (202) 797-6800

STATEMENT OF
ERIK D. OLSON, COUNSEL,
ENVIRONMENTAL QUALITY DIVISION,
OF THE
NATIONAL WILDLIFE FEDERATION

HEARINGS ON GROUNDWATER CONTAMINATION IN THE UNITED STATES

BEFORE THE
SUBCOMMITTEE ON ENVIRONMENT AND LABOR
OF THE
COMMITTEE ON SMALL BUSINESS

UNITED STATES
HOUSE OF REPRESENTATIVES

101st CONGRESS, FIRST SESSION

NOVEMBER 14, 1989

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I. INTRODUCTION.

Good morning, I am Erik D. Olson, Counsel for the Environmental Quality Division at the National Wildlife Federation. The Federation is the nation's largest citizen conservation organization, with over 5.8 million members and supporters nationwide, and with affiliated organizations in 52 states and territories. We thank the Subcommittee for inviting the Federation to testify on the important issue of groundwater.

The Federation commends the members of this Subcommittee, and in particular Chairman Torres, for holding these hearings calling attention to the nation's serious groundwater pollution problems. The public's interest in protection of water quality and drinking water is clear. For example, a 1989 report reviewing public opinion polls taken by Lou Harris, Roper, Cambridge Reports, and other recognized national polling companies, concluded that public concern with these problems has steadily increased over the past several years.[1] In 1988, 84 percent of the American public was "very concerned" about fresh water pollution, 63 percent thought toxic waste problems were getting worse, and 70 percent thought that the government is

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1. Americans for the Environment, Sierra Club, and National Wildlife Federation, The Rising Tide: Public Opinion, Policy, & Politics (April 20, 1989).

doing too little about solid waste.[2] Moreover, in 1988, 55 percent thought that "most" underground drinking water sources are polluted or that "as many underground sources of water are contaminated as are uncontaminated."[3] As recently as 1981, just 28 percent of the respondents felt that contamination was so widespread.[4] Similarly, a 1987 poll of the National Wildlife Federation's Associate members found that drinking water quality was the most important environmental issue to them.[5]

Thus, it is becoming increasingly clear that public concern about groundwater pollution is mounting. We urge the Subcommittee to recognize that while further education and research on groundwater pollution is needed, multi-year research programs must not be used as an excuse to avoid comprehensive groundwater protection legislation that is needed to address directly today's problems. The time has come to enact comprehensive groundwater protection legislation. To date, only the legislation proposed last session by Senators Durenberger, Baucus, Stafford, and Chafee, S. 2091 and S. 2092, which has not

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2. Ibid.

3. Ibid.

4. Ibid.

5. National Wildlife Federation, 1987 Environmental Quality Index.

yet been reintroduced this session of Congress, would establish such a comprehensive groundwater protection regulatory regime. While the National Wildlife Federation believes that those bills have gaps and some rough spots, we think that they are the best vehicle introduced to date to debate the important groundwater protection issue.

As the nation ignores the "out of sight and out of mind" groundwater pollution problem, millions of individual pollution sources, ranging from enormous leaking industrial lagoons to improperly operated backyard septic tanks, continue to spread their poisons. They pollute underground sources of drinking water and water that is the lifeblood for many sensitive aquatic ecosystems.

We are pleased that the Subcommittee has recognized the need to consider the substantial implications of groundwater pollution for small businesses. Small businesses are directly involved in this groundwater problem every day, both as victims of pollution, and as the often inadvertent culprits of groundwater contamination problems.

It is impossible to know precisely how many small businesses--ranging from roadside restaurants to motels to stores--have had their water supplies contaminated and rendered unsafe for contamination by groundwater pollution. As is

discussed later in this testimony, according to EPA, over 50,000 people were reported to have become acutely ill from 1971-1985 from drinking contaminated groundwater, and scientists believe that the actual number of groundwater pollution-related illnesses--ranging from acute gastrointestinal disease to possible cases of cancer and spontaneous abortion--likely was many times that number. The costs of these illnesses simply in terms of lost productivity--not to mention the human suffering--are staggering. Few if any businesses can survive for long without an adequate supply of safe water for their employees and customers. Clean water is even critical to running many businesses' equipment.

Moreover, the costs of cleaning up polluted groundwater to assure the protection of public health and the environment potentially could destroy the livelihood of many small companies held liable for that cleanup. Numerous small businesses have learned the hard way that groundwater pollution cleanup can cost them hundreds of thousands or millions of dollars. Even the cost of simply drilling a new well to replace a polluted one can be significant. Undoubtedly, some small businesses have gone bankrupt due to the extremely high costs of groundwater cleanup. The costs of taking preventative measures to avoid the pollution--while initially perhaps appearing painful to some

businesses--are a fraction of the cleanup costs. The old adage that a penny of prevention is worth a pound of cure was never so apt as it is in discussing groundwater pollution.

Experience shows that cleaning up polluted aquifers is extremely expensive (if it is even possible), on the average costing $21,000,000 to $30,000,000 at each Superfund site,[6] and costing $100,000,000.00 or more at some larger sites.[7] There are about 30,000 sites on EPA's CERCLIS that are being considered for Superfund designation, and over 1100 sites that have been designated or proposed for designation on the Superfund National Priority List for cleanup.[8] Some small businesses have found themselves in the trap of having contributed to Superfund sites, and they often are hard-pressed to pay for cleanup.

Moreover, the cost to taxpayers of groundwater cleanup are awe-inspiring. GAO has estimated that total cleanup and upgrading costs just at Department of Energy facilities will be as much as $155,000,000,000.00 (billion) dollars.[9]

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6. See, Clean Sites Inc., Making Superfund Work: Recommendations to Improve Program Implementation (January, 1989).

7. For example, at the Rocky Mountain Arsenal Superfund site, cleanup and restoration costs are estimated at $2 billion dollars or more.

8. GAO, Superfund: Missed Statutory Deadlines Slow Progress in Environmental Programs, GAO/RCED-89-27 (November, 1988).

9. See, e.g., GAO, Nuclear Health and Safety: Dealing With Problems in the Nuclear Defense Complex Expected to Cost Over $100 Billion, GAO/RCED-88-197BR (July, 1988).

But this "National Groundwater Debt" at federal facilities and designated Superfund sites is only the tip of the iceberg. In addition to hazardous waste disposal at these sites there are literally hundreds of thousands, and perhaps millions, of other sites at which the groundwater has been polluted by sources such as business facility spills and leaks, hazardous substance stockpiles, sewage treatment plants, oil and gas production and refining waste, and agricultural application of pesticides and fertilizers. It simply will not be feasible to clean up the groundwater at every one of these sites.

For this reason, we must start to prevent contamination today, rather than trying to pay to clean up the "Augean stables" we have created tomorrow. Prevention of such contamination is far preferable for public health and environmental concerns, and is far less costly as well.

Thus, the only rational approach is to prevent groundwater pollution before it happens through comprehensive, minimum national groundwater protection requirements. These requirements should establish baseline national public health protections. Small businesses that might be inclined to adopt certain measures to protect their and their neighbors' water supplies would thereby avoid being placed at a competitive disadvantage when they pay for those prevention measures, because all of their

competitors also would be required to adopt groundwater protections. In the long run, it is most sensible from the environmental and human health standpoint to require a baseline level of national groundwater protection; such a prevention-oriented approach also makes the best economic sense.

II. THE EXTENT OF THE GROUNDWATER POLLUTION PROBLEM.

A. Groundwater Pollution Is a National Problem.

Recent studies, including a detailed national survey of groundwater contamination by the U.S. Geological Survey (USGS) released late in 1988, document that groundwater is polluted in all 50 states from a variety of manmade sources.[10] These include hazardous waste dumps, industrial and municipal landfills, hazardous material handling, storage, and transfer, underground injection wells, excessive or inappropriate application of fertilizer and pesticides, intensive animal husbandry, leaking storage tanks above and underground, faulty septic systems, road salt storage and use, and many other sources.

No comprehensive national groundwater pollution monitoring program exists. However, state and federal groundwater

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10. USGS, National Water Summary 1986: Hydrologic Events and Groundwater Quality, USGS Water-Supply Paper 2325 (1988); see also, Office of Technology Assessment, Protecting the Nation's Groundwater From Contamination, (1984).

monitoring programs have begun to sound the alarm bells. For example, U.S. Geological Survey tests of over 120,000 wells across the country found nitrate contamination at concentrations above EPA's 10 ppm health standard in over 7,900 of those wells and elevated levels of nitrates (between 3 and 10 ppm) in over 16,300 additional wells.[11] Nitrate contamination can cause infants to lose their ability to absorb oxygen causing the "blue baby syndrome," and may cause other health effects. Nitrate pollution often is linked to improper fertilizer use or to human and animal waste and has been found to exceed EPA's health standard in wells in 48 states.[12] In several states surveyed by USGS or state agencies as many as one in four wells were polluted above safe health levels with nitrates.[13]

Similarly, EPA has found that at least 22 pesticides contaminate groundwater in 24 states and that one in every four wells tested in certain agricultural areas are contaminated with pesticides. On Long Island, New York over 2400 wells have been

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11. Madison, R.J. and J.O. Brunett, "Overview of the Occurrence of Nitrate in Ground Water of the United States," in USGS, National Water Summary 1984, Water Supply Paper 2275 (1985).

12. Ibid.

13. Ibid.

contaminated with the insecticide Aldicarb and its residues.[14] In Florida, more than a thousand wells were condemned because of ethylene dibromide contamination. A 1986 study of pesticides in groundwater in California found that one in four of the 8,300 wells tested for pesticides were contaminated.[15]

Industrial chemical and waste contamination has closed thousands of wells across the nation. In New Jersey alone, according to one estimate, 5,000 wells have been closed due to groundwater pollution.[16] A few examples of California's contamination are discussed in recent press clippings attached as Appendix A to this testimony.

Tests of private wells in some states, such as Kentucky[17] and Pennsylvania,[18] have found that 30 to 50 percent of the wells

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14. U.S. Environmental Protection Agency, "National Primary Drinking Water Regulations; Synthetic Organic Chemicals, Inorganic Chemicals and Microorganisms; Proposed Rule," Federal Register 50 (219): 46985 (November 13,1985).

15. State of California, Department of Food and Agriculture, Sampling for Pesticide Residues in California Well Water: 1986 Well Inventory Data Base. Report to the Legislature pursuant to the Pesticide Contamination Prevention Act (1987).

16. G. Bishop, "Without Water, Everything Else is a Mirage," [Newark, N.J.] Star-Ledger, Feb. 15, 1989.

17. C. Chriss, "Bad Well Water: Problem is Big, But Little Being Done," Lexington [Kentucky] Herald-Leader, February 28, 1988.

18. B. Birt, "Bacteria Being Found in More Private Water," [Levittown, Pennsylvania] Courrier Times, January 22, 1988.

tested are contaminated with unsafe levels of bacteria. The list goes on. As we gather more data it is becoming increasingly clear that contamination of the groundwater by industrial, agricultural and many other sources, is serious and widespread.

B. The Health and Environmental Effects of Polluted Groundwater.

Groundwater pollution has emerged as a public health and environmental issue of the first magnitude. Groundwater provides about half of the nation's population with its drinking water. Over 95 percent of rural residents use groundwater for drinking water. Yet groundwater is polluted across the nation by a wide variety of chemicals and pathogens.

The Environmental Protection Agency (EPA) has found that, according to public health records, from 1971-1985 over 52,000 people have become ill in outbreaks of disease or acute chemical poisoning due to drinking contaminated groundwater.[19] According to EPA, some researchers believe that due to underreporting of outbreaks and illnesses, the actual number of illnesses may be twenty five times larger.[20] Tragically, South Dakota officials

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19. U.S. EPA, Proposed National Primary Drinking Water Regulations; Total Coliforms. 52 Fed. Reg. 42,226 (Nov. 3, 1987).

20. U.S. EPA, Proposed National Primary Drinking Water Regulations; Filtration and Disinfection. 52 Fed. Reg. 42,183 (Nov. 3, 1987).

have reported that high levels of nitrates in groundwater used for baby formula killed an infant in that state recently.[21]

For reasons discussed in greater detail in Appendix B to this testimony, the number of chronic illnesses and latent diseases, such as cancer, caused by polluted groundwater has yet to be determined on a national level. However, two recent studies suggest that these more subtle and insidious effects may be more widespread than once believed. For example, a national study (released in April, 1989) conducted by EPA and academic scientists found "significant associations" between the rates of certain forms of cancer, such as bladder, stomach and intestinal cancer, and counties with hazardous waste sites that have contaminated groundwater.[22]

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21. Water Information Center, Groundwater Newsletter, vol.15 no. 18 at 1 (Sept. 30, 1986); see also, Busch and Meyer, A Case of Infantile Methemoglobinemia in South Dakota, J. of Environmental Health, v. 44., at 310-11 (May/June 1982)(reporting previous nitrate in groundwater related infant poisoning, treated before death resulted, in South Dakota).

22. J. Griffith, et al., "Cancer Mortality in U.S. Counties With Hazardous Waste Sites and Ground Water Pollution," Archives of Environmental Health, vol. 44, no. 2, page 69 (March/April, 1989). The authors cautioned that "more definitive" studies were needed to define the magnitude of these risks, but said that counties with hazardous waste sites leaking into the groundwater could be correlated with certain forms of excess cancers, and that hazardous waste in groundwater could used as an "initial index" of exposure to toxics.

Similarly, another study published in 1989 found that pregnant women in California who drink tap water pumped from groundwater "had the greatest risk" of having spontaneous abortions, compared to pregnant women drinking bottled water; the specific toxics that might have been responsible for such spontaneous abortions were not identifiable.[23]

Although there are no good national data on the number of cancers, spontaneous abortions, birth defects, or chronic health problems resulting from groundwater pollution, we do know that groundwater in every state is polluted with a cornucopia of organic and inorganic pollutants. Many of these chemicals are suspected of causing an array of health problems, including birth defects, reproductive failure, suppression of the immune system, or cancer.[24] We are just beginning to understand the mechanisms of many of these diseases and simply have not studied in any detail most populations exposed to groundwater pollution.

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23. I. Hertz-Picciotto, et al., "Spontaneous Abortions in Relating to Consumption of Tap Water: An Application of Methods From Survival Analysis to a Pregnancy Follow-Up Study," American Journal of Epidemiology, vol. 130, no. 1, page 79 (1989).

24. See, e.g., Office of Technology Assessment, Protecting the Nation's Groundwater From Contamination, vol. 1 at 23-36 (1984); National Academy of Sciences, National Research Council, Drinking Water and Health series (1977-1987).

Groundwater pollution problems also can become surface water pollution problems. Nearly a third of the flow of the nation's surface water comes from groundwater and in many surface streams all of the flow originates from groundwater during droughts. Sensitive aquatic ecosystems in surface wetlands and streams, therefore, can be harmed by groundwater pollution, as can the unique subterranean ecosystems that are fed by groundwater in some regions. At many Superfund sites, for example, toxic contamination from buried waste and from leaks has contaminated nearby wetlands and streams and threatened fish and wildlife. Similarly, EPA and other agencies believe that one of the major sources of toxic contamination to the Niagara River may be the seepage of polluted groundwater into the river from the numerous nearby waste dumps and other facilities.[25]

III. COMPREHENSIVE FEDERAL LEGISLATION IS NEEDED.

At a previous Congressional hearing, one witness argued against federal intervention:

> The effect of this [legislation], if enacted in its present form, is to shoulder aside local, state, and multi-state efforts to deal with the [pollution] problems....This...is, at best premature, in our judgment. The control

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25. See, e.g., "Preliminary Evaluation of Chemical Migration to Groundwater and the Niagara River from Selected Waste Disposal Sites," EPA Report 905-4-85-001 (March, 1985).

> of...pollution is best handled at the state and local level because it involves a weighing of many interests which local officials are most competent to evaluate. The states and local governments must be given a fair chance to deal with it....
>
> In short, just as the states are getting together to solve their local joint problems, the Federal Government now threatens to apply a heavy hand. It is submitted that this problem is not so critical as to remove it from local and state governments that are now alert to the need for prompt and effective action, and which are now acting.[26]

This testimony was delivered to the Senate Public Works Committee over twenty years ago when opponents of federal clean air legislation were arguing that clean air was a local concern and that the federal government should keep its nose out of states' business. With the leadership of Senator Ed Muskie and his colleagues in the Senate and in the House of Representatives, Congress soundly rejected these arguments and took steps to protect the American public from air pollution by enacting comprehensive federal clean air legislation.

Today, we hear the same time-worn arguments in the groundwater context. We are told that somehow groundwater pollution is a uniquely local problem, that we should not burden

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26. Statement of Orville V. Bergen, Illinois Manufacturers Association, in Air Pollution--1967 (Air Quality Act): Hearings Before the Subcommittee on Air and Water Pollution of the Committee on Public Works, United States Senate, on S. 780 and Related Matters Pertaining to the Prevention and Control of Air Pollution, 90th Cong., 1st Sess., Part 3 at 2167-68 (1967).

industry or states with a new federal law that tells them to protect the nation's citizens from polluted groundwater and that the status quo is just fine. Today, however, we all should know better.

Will our children and grandchildren, in the year 2025, look back to the late 1980's, and say, "they had a chance then to prevent the devastation of the nation's groundwater, over 90 percent of our fresh water, but they lacked the vision to save this precious resource?" Will they have to ask why, just over 35 years before, the nation recognized the problem and could have prevented the creation of millions of sites of contamination, but lacked the will and courage to act?

Federal groundwater legislation is needed today, for several reasons:

1. All Americans Deserve Protection.

Every citizen must be guaranteed safe drinking water. It is now painfully obvious that public health and the environment are not adequately protected from groundwater pollution. All Americans, regardless of their State or county of residence, should be afforded at least certain minimum national protections of their health and their environment from groundwater pollution.

2. Current Federal Laws Conflict, Are Inadequately Coordinated, and Have Many Gaps.

While Congress has adopted several laws designed to address some of the sources of groundwater pollution,[27] there is an urgent need for coordination of these and other statutes.[28] As is discussed in greater detail in Appendix C to this testimony, there is an even more urgent need to fill the gaps and weaknesses left by those laws; current laws are allowing widespread and often uncontrolled groundwater pollution from numerous sources.

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27. For example, Congress has enacted the Resource Conservation and Recovery Act, the Hazardous and Solid and Waste Amendments of 1984 ("HSWA"), the Comprehensive Environmental Response, Compensation, and Liability Act ("Superfund"), the Superfund Amendments and Reauthorization Act of 1986, and the Safe Drinking Water Act and that Act's 1986 Amendments.

28. Examples of poor coordination and conflict include several federal laws that establish different protection strategies and cleanup standards for precisely the same contaminants that come from different pollution sources. For example, a sewage treatment lagoon at a Publicly Owned Treatment Works receiving toxic industrial waste through sewers might be required to have no groundwater protections, may be purposely designed to percolate waste into the ground, and the groundwater pollution it causes may not be required to be cleaned up. A similar lagoon handling similar contaminants on industrial property next door might be subject to relatively strict hazardous waste containment and cleanup requirements. Similarly, an enormous, unlined "reserve pit" at an oil field containing numerous toxics often would be subject to virtually no groundwater protection requirements, while a landfill on other industrial property containing many of the same toxics in waste designated "hazardous" might have to be monitored and lined. Moreover, even when groundwater cleanup is required, in certain cases EPA interprets the cleanup standards under RCRA to be different from those under Superfund, even though the same contaminants may be involved.

These gaps include inadequate or nonexistent controls on: many industrial "non-hazardous waste" pits, ponds, lagoons and landfills; sewage treatment plant lagoons; municipal landfills; mines and mining waste; oil and gas production waste and reserve pits; agricultural sources of pollution such as pesticides, chemical fertilizers, animal feedlots and chemigation; septic tanks and cesspools; above ground tanks and materials storage and handling facilities; and many other important sources.

The Safe Drinking Water Act's water supply provisions provide no protection from drinking polluted water to the millions of Americans who get their water from private wells.[29] Also, EPA generally has failed to protect users of "noncommunity" public water systems, such as wells used to supply water directly to many small businesses such as restaurants, hospitals, factories and seasonal resorts or camps.[30]

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29. This is because the Act's Maximum Contaminant Levels for pollutants in drinking water apply only to "public water systems," defined to include systems serving piped water for human consumption to at least 15 service connections or regularly serving 25 or more people. See, 42 U.S.C. § 300f(4).

30. EPA's Inspector General issued a report in September, 1988, that documented a virtually complete breakdown in EPA enforcement and implementation of the drinking water program for noncommunity systems and interstate carrier conveyances (e.g. trains, busses and airplanes) in EPA Region III; EPA admitted in an attachment to that report that all EPA regions' programs are essentially the same as Region III's program. EPA Inspector General, Report of Audit E1HW7-03-0171-81928, Non-Community Water System Program, (September, 1988). Some of the Agency's standards are supposed to protect some noncommunity water supplies from some pollutants, but millions of users of tens of thousands of such systems remain largely unprotected by the federal drinking water program.

3. There Are Serious Gaps in State Protections.

Although some states have begun to attack groundwater pollution aggressively, many have not. Groundwater protection programs in most states mirror the federal requirements under existing federal laws. Thus, the groundwater impacts of major sources of groundwater pollution, such as pesticides and fertilizers, mining, municipal landfills and above ground storage tanks, often are poorly controlled at the state level, if they are regulated at all.

4. State and Local Regulators Find it Difficult to Regulate Important Local Industries Without a Federal Mandate.

Because of interstate and inter-community competition to keep and attract economically important industries, many state and local regulators and legislators find it extremely difficult to regulate the groundwater impacts of these industries. Indeed, many states have provisions in their state laws prohibiting state environmental regulators from being any more stringent than federal law requires. These states and communities need a clear federal mandate to allow them to act.

In addition, groundwater, and therefore its pollution, does not respect political boundaries. Therefore, no matter how strict a state's or locality's laws, pollution from lax neighboring states or communities may despoil its groundwater.

5. The Federal Government Is Spending Billions Each Year on Cleanup; These Costs Will Escalate If Preventive Action Is Not Taken Now.

Each year, the federal government and private parties spend billions of dollars cleaning up our past mistakes. Congress has enacted Superfund, with a ten-year trust fund in excess of ten billion dollars. Under the liability provisions in Superfund and the Resource Conservation and Recovery Act (RCRA), the government and private parties will spend many times that amount.[31] The total costs to taxpayers for cleaning up toxic waste dumps on Department of Defense, Interior Department and other federal lands will be well over 100 billion dollars, with clean up on public lands and at private sites extending well into the 21st Century.[32]

Of course, waste site clean ups are very important, and are necessary to assure that public health and the environment are not threatened by these toxic sites. But we are spending little

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31. See, e.g., GAO, Hazardous Waste: Corrective Action Cleanups Will Take Years to Complete, at 22 & note 2 (GAO/RCED-88-48) (Dec. 1987)(estimates that RCRA corrective action may cost up to $22.7 billion, and notes that Superfund cleanup costs may cost up to $39.1 billion for up to 4,200 sites.).

32. See, GAO, Nuclear Health and Safety, supra; see also, GAO, Superfund: Civilian Federal Agencies Slow to Clean Up Hazardous Waste (GAO/RCED-87-153) (July, 1987)(criticizing slow federal agency progress in identifying and cleaning up hazardous waste sites on federal lands); GAO, Hazardous Waste: Corrective Action Cleanups Will Take Years to Complete, at 22 & note 2 (GAO/RCED-88-48) (Dec. 1987)(estimates that RCRA corrective action may cost up to $22.7 billion, and notes that Superfund cleanup costs may cost up to $39.1 billion for up to 4,200 sites.)

on preventing the very same problems from recurring in the future. With each succeeding year of inaction we can be assured that more groundwater pollution sites are being created that will require cleanup. As a nation, we are penny wise and pound foolish.

Our failure to offer even minimal expenditures for protection of groundwater is highlighted by the FY 1989 Budget. The budget includes no money to pay for two very modest groundwater protection programs adopted by Congress in the 1986 Safe Drinking Water Act Amendments: the Wellhead Protection Program and the Critical Aquifer Protection Area program.

It is time for the federal government to recognize that we must now embark on what undoubtedly will be one of the key environmental issues of the 1990's: preventing groundwater pollution. We have a responsibility to act as stewards of the nation's groundwater resources, protecting them for use by future generations. The National Wildlife Federation urges the members of this Subcommittee, therefore, to propose and support the enactment of comprehensive groundwater protection legislation. The elements of such legislation are suggested in Appendix D to this testimony and more fully discussed in a report issued in 1988 by several major environmental organizations.[33]

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33. Protecting the Nation's Groundwater: A Proposal for Federal Legislation, (National Wildlife Federation, Environmental Policy Institute, Natural Resources Defense Council, Environmental Defense Fund, et al., June 24, 1988).

IV. CONCLUSION.

There is no justification for waiting for more studies before we begin to require protective measures to prevent groundwater contamination. Without such preventive action, a legacy of scarce, polluted groundwater that may forever be impossible to clean up or use will be our bequest to our heirs. We know enough now to act; let us not miss this opportunity!

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APPENDIX A

Selected News Articles on Groundwater Pollution in California

Extensive Pollution of Ground Water Determined in Study

By STEVEN R. CHURM, *Times Staff Writer*

A cancer-causing chemical has polluted a vast pool of underground water stretching more than 3 miles from the western edge of the El Toro Marine Corps Air Station to the heart of residential Irvine, a study released Wednesday by the Orange County Water District showed.

Ground-water contamination near the military base has been suspected for several years, but the breadth of contamination—more than 2,900 acres—had not been identified until the water district recently completed its yearlong, nearly $1-million study.

The report, presented Wednesday to the district's 10-member Board of Directors, blamed the tainted ground water on the military, which routinely disposed of toxic wastes, including cancer-causing trichlorethylene, also known as TCE, at the base for nearly four decades before the practice was halted in the early 1980s.

No Immediate Threat Posed

The result, the study concluded, has been widespread contamination of up to 150,000 acre feet of ground water. (About five adults use the equivalent of about an acre foot of water a year.)

Water district officials stressed that the polluted ground water does not pose any immediate threat to commercial or domestic water supplies in the area. The nearest domestic water wells operated by the Irv Ranch Water District are 2 miles away from the spreading contamination.

"There is absolutely no threat to any domestic water supplies," district spokesman James Van Haun said.

Levels of TCE in water analyzed from some agricultural and test wells located between North Lake in Irvine and the western boundary of the Marine base were, in some cases, 10 times the allowable limit for safe drinking water, the report concluded.

The pocket or "plume" of contaminated water, the report stated, is about 3 miles long and half a mile wide and is moving in a westward direction at a rate of 1 to 4 feet a day. Since 1985, when the water district first detected TCE traces in the ground water, officials estimate the plume has "migrated" west about a mile, to a point halfway between Jeffrey Road and Culver Drive in the Woodbridge area of Irvine.

While there is no present health threat, water district General Manager William R. Mills warned that the plume, if left unchecked, eventually could reach the Irvine Ranch Water District's domestic water wells. In time, it could also threaten an area near Irvine Center Drive, where the Irvine Ranch district is contemplating sinking several new domestic water wells.

As a result, the Orange County Water District board agreed Wednesday to negotiate with the Irvine Co. and the Irvine Ranch district to begin pumping the contaminated water out of the aquifer

Please see WATER, Page 5

WATER: Contamination Found

Continued from Page 3

and mixing it with reclaimed water used for irrigating corps and landscape. Once the tainted water is exposed to air, the TCEs "volatilize" and dissipate into the atmosphere, greatly reducing any health or safety risk to plant life or humans, Van Haun said.

But even if the cleanup approach is implemented, it would only remove about 2,000 acre feet of contaminated water a year.

"It would not solve the problem overnight," Mills said. "But at least we might slow the migration of the plume."

The only wells now affected by the contaminated water are used for agricultural purposes, but Van Haun said that could change. As rapidly growing Irvine continues to urbanize, it may need to convert those wells for commercial or domestic use.

"But that would be impossible unless the ground water is cleaned up," Van Haun said.

The cost of the Orange County Water District study, including drilling of four new wells to test for contaminants, was close to $1 million. District officials contend that the military should eventually reimburse the agency for the cost. Any cleanup costs, including the proposed pumping out of the aquifer, should also be paid by the military, Mills said.

Military 'Unconvinced'

But military officials, who are nearing completion of their own $1.2-million ground-water study within base boundaries, believe they may not be entirely responsible for the contamination.

Capt. Stan Holm of the Navy's civil engineer corps said Wednesday that the TCE contamination could have come from the Orange County International Raceway, a drag strip that operated for 17 years before closing in 1983 along the Santa Ana Freeway, just west of the Marine base.

"We know we have some [TCE] hot spots that have moved off the base that we have to address," Holm told the water board.

But during a break in the meeting, Holm said the military remains "unconvinced" that it is to blame for all the contamination.

The TCE-contaminated ground water—as well as three on-base landfills containing solid wastes—prompted the U.S. Environmental Protection Agency last June to add the El Toro facility to its Superfund hazardous-waste cleanup list.

Most of the toxic waste produced at the base, including TCEs, stems from maintaining jets and helicopters. For example, each year the El Toro base disposes of 166,000 gallons of used motor oil and hydraulic fluid and 281,000 gallons of waste fuel, according to county health records.

Los Angeles Times
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Pesticides found in 25% of wells

But state says available water is OK

557

Daily News

More than one quarter of water wells tested throughout California contain traces of pesticides, state officials said Thursday.

Assemblyman Lloyd Connelly, D-Sacramento, who sponsored legislation that created the testing program two years ago, said any trace of pesticide residue is cause for alarm.

Connelly estimated that 10 percent of polluted wells exceed state health standards.

However, officials with the state Department of Food and Agriculture, which conducted the report, said any wells identified as unsafe have been cleaned up or shut down.

"We are not finding any new pesticides," said Jan Wessell, a spokeswoman for the Department of Food and Agriculture. "Most of these chemicals have been banned."

She said the problem of potential cancer-causing chemicals in drinking water does not appear to be increasing.

Connelly, however, said the pesticides are dangerous. He noted that half of California's drinking water comes from ground-water sources.

"When you pollute one of these sources, they don't correct themselves quickly," Connelly said.

According to the report, many farm chemicals that have been banned, restricted or suspended are still showing up in wells. Researchers said they believe the traces are left over from earlier use and do not indicate continued use of illegal pesticides.

Test results were submitted between September 1986 and August 1987 by county, state and federal agencies from 530 wells in 19 of California's 58 counties. Of those wells, 190 wells in 14 counties were reported to contain pesticide residues.

The previous year's report, 8,376 wells were sampled and 2,303 were positive.

Counties with wells showing pesticide residues in the most recent tests were Contra Costa, Del Norte, Fresno, Humboldt, Imperial, Kern, Los Angeles, Merced, Riverside, San Bernardino, San Joaquin, Stanislaus, Tulare and Yolo.

Los Angeles Times
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Polluted Ground Water Found at Schools

Public Not Endangered at 3 Sites, County Health Officials Say

581

By DAVE LESHER, *Times Staff Writer*

County health officials said Wednesday they have found contaminated soil and ground water, caused by leaking underground fuel tanks, at three high schools in Huntington Beach and Fountain Valley. They stressed that the public has not been endangered.

Public Health Services spokesman Robert E. Merryman said the ground-water levels of benzene, a carcinogen found in gasoline, at Marina High School in Huntington Beach are the highest ever recorded in the county. The other schools are Fountain Valley and Edison high schools in Huntington Beach.

Merryman said the contamination on the schools has not reached the drinking water in underground aquifers or produced hazardous vapors.

"The public has not been exposed to any dangers," Merryman said. "If we can proceed with an expeditious cleanup, the public will not be endangered in any way."

Merryman said the contamination was announced in a written statement issued under the rules of Proposition 65, a 1986 measure that requires public notice of any area or product that contains possibly carcinogenic materials.

David J. Hagen, assistant superintendent for the Huntington Beach Union School District, which administers all three schools where the contamination was found, said a consultant is preparing a plan for cleaning up the sites. He said the work is expected to cost about $300,000. That expenditure, he said, will cut deeply into the district's maintenance budget for the year.

"We have warned all of our principals during this coming year that, obviously, emergency maintenance will be done but some of the other maintenance we might not get to," Hagen said.

The tanks that leaked were used to store gasoline for school vehicles. They were removed last July when the schools began to use other facilities for fueling their cars.

Hagen said the tanks were inspected for leaks annually until a year before they were removed and the district was never warned about leaks. He said district officials believed they were being cautious in removing the tanks so they would not risk future leaks.

The district also removed underground fuel tanks at two other high schools, but they had not leaked. The leaking tanks were between 10 and 20 years old and had a capacity of about 1,000 gallons, the officials said.

The soil contamination levels ranged from about 58,000 parts per billion of benzene at Fountain Valley High School to 255,000 p.p.b. at Edison High School. The ground-water contamination levels ranged from 4,020 p.p.b. at Fountain Valley High School to 40,900 p.p.b. at Marina High School, the highest level ever recorded in the county.

The county's written statement says the hazardous level for benzene in drinking water is 0.7 p.p.b.

Merryman explained that, while there is ground water 8 to 14 feet below the surface, the drinking water aquifer is about 200 feet below ground.

Since 1984, when a state law was passed requiring the inspection of all underground fuel tanks, the county has found 806 leaking tanks, Merryman said. He said 329 of those have been cleaned up. He said there are about 8,000 underground tanks in the county.

Polluted Well Water Poisons Life of Purity in Mountains

557 Groundwater

By DARYL KELLEY, *Times Staff Writer*

LAKE ARROWHEAD—A careful mother, Cher Fish refused to serve her infant daughter processed baby food for fear of additives.

But drinking water was another matter.

She had faith in the purity of the fresh water pumped from wells near her home on a ridge overlooking sparkling Lake Arrowhead.

Then, one morning in late February, Fish turned on her kitchen faucet and gasoline came out.

"It smelled like pure gasoline. It smelled so strong that I took a match to it to see if it would burn," she said. The gas-and-water mixture did not ignite, she said, but she immediately stopped drinking the tap water.

Tiny red bumps broke out on Fish's neck from a shower earlier that day. And a heavy rash developed on her daughter after washing.

When planning her baby's first diet two months before, Fish had called the water company. "They said, 'It's pure well water,'" she recalled.

"I really trusted people, trusted the system, so I let my little girl drink that water. I made her food with it," the young mother said recently as she packed for her family's move to a farm in Maine, a decision prompted by the tainted water.

"The first thing we'll do there," she said, "is test the well."

Arrowhead Villas, a cluster of 720 aging cabins and new chalets, is the latest California community to discover poisonous chemicals from underground storage tanks in its drinking water.

Contaminated Wells

At least 50 wells in public water systems throughout the state have been contaminated by leaks from underground tanks. Another 160 private drinking-water wells, serving individual homes, have been polluted.

State health officials say that fuels and solvents from tanks do not usually pose health risks. However, the longer contaminated water is consumed, the greater the potential harm.

At Arrowhead Villas, no one knows for sure how long gasoline has been in the wells. A slick petroleum sheen was found on a creek next to the wells last summer, and some residents say they noticed an obnoxious taste and odor in their water as early as late February.

Although the villas' wells were not shut down until late April, health officials say that residents were not in danger—that pollution levels were generally too low and exposure too brief for harm.

Before the gasoline-water mixture began to pour from their tap, the Fishes—locksmith husband George, Cher and their baby—had lived happily for two years in Arrowhead Villas, a San Bernardino Mountains community one-half mile from the popular lake.

Once a retreat for silent-movie stars and bootleggers who made whiskey from its pure water, Arrowhead Villas is filled today with refugees from big cities who have moved to its 5,000-foot elevation for towering pine trees, clean air and, in many cases, the drinking water.

"I bought this place because Lake Arrowhead water was sparkling clean—fantastic," said the Fishes' neighbor, Nancy Reich, who stopped drinking tap water in early March after she and her 14-year-old daughter had suffered from headaches for three weeks.

"We had the highest-purity water found anywhere in Southern California," said John Traband, a former USC professor turned restaurateur. But in April, when Traband's customers "suddenly started complaining about the quality of their drinks," he detected a "petroleum taste" in the water.

Community Poisoned Itself

The pollution problem does not affect other Lake Arrowhead communities or the famous springs that produce Arrowhead bottled water.

The situation at Arrowhead Villas is even more painful because the community had, in effect, poisoned itself.

The villas' water company owns the two corroded tanks that leaked gasoline and diesel fuel through 20 small holes into its water supply. The tanks, estimated to be 40 years old, were buried within 50 feet of the two wells that provided all the community's water except during peak summer and holiday seasons.

Homeowners must pay costs that begin at about $70,000 to analyze the problem and to install a water-filtration system, community leaders say.

Soil must also be cleansed through aeration or vapor

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BURRELLE'S

Montrose DDT Site Still Toxic

EPA Finds Widespread Contamination of Water Basins

By SHERYL STOLBERG, *Times Staff Writer*

Contamination from a shuttered Harbor Gateway chemical plant that manufactured DDT for 35 years is more widespread than earlier believed and has tainted underground water basins as well as nearby homes and businesses, the U.S. Environmental Protection Agency has reported.

Recent EPA tests found the banned pesticide and another dangerous chemical—the solvent monochlorobenzene, or MCB—in the Bellflower and Gage aquifers, which run underneath the site of the Montrose Chemical Corp. but do not supply drinking water.

In both aquifers, MCB, which can cause liver and kidney damage, was much more prevalent than DDT, a suspected carcinogen. In the Bellflower aquifer, the one closest to the surface, the tests showed MCB at concentrations of 600,000 parts per billion—10,000 times the maximum standard proposed by the EPA.

Two deeper aquifers—the Lynwood and Silverado aquifers, which do feed into the drinking water supply—have not yet been tested, although tests are planned.

The lower aquifers are separated from the upper aquifers by a natural layer of clay, which water company officials say has generally protected the drinking water supply from contamination.

Assessing the Threat

Johanna Miller, who is supervising cleanup of the site for the EPA, said officials are "confident that if it has reached a drinking water aquifer, the contamination would not have yet reached an actual drinking water well."

The closest well is two miles away and has turned up no evidence of contamination, according to officials at the Dominguez Water Co., which maintains it, and the Central and West Basin Water Replenishment District, which reviews tests conducted by all the water companies in the area.

John Joham, district general manager, said he is not concerned about the EPA's findings at the former Montrose plant.

But, he said, "we want to keep our eye on it. We're not going to go ahead and ignore it and stick it in a

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Recent EPA tests found the banned pesticide and another dangerous chemical—the solvent monochlorobenzene, or MCB—in the Bellflower and Gage aquifers, which run underneath the site of the Montrose Chemical Corp. but file someplace and let it get dusty."

The 13-acre Montrose site, on Normandie Avenue near the intersection of the Harbor and San Diego freeways, has been targeted for placement on the EPA's "Superfund" list of the worst toxic waste sites in the nation.

High Concentration of DDT

The Montrose Chemical Corp. manufactured DDT there from 1947 until 1982, when an EPA investigation revealed unusually high concentrations of DDT in surface water runoff and sediments leaving the property. The plant is now closed.

Tests conducted since that time continue to reveal toxic waste on and off the site. Miller said that "through each phase of our investigation, we have discovered that the contamination has traveled farther than we would have expected."

Miller said EPA officials were particularly surprised to find DDT in the two upper aquifers, because DDT is not generally thought to be soluble. However, it apparently mixed with the solvent MCB, which allowed it to spread.

In addition to the ground water contamination, the most recent round of EPA tests revealed significant levels of DDT in dust and soil samples taken from 23 homes and businesses near the Montrose site. The EPA report said the contamination is not serious enough to produce "any immediate health effects."

Residents Are Skeptical

Area residents, however, are skeptical. And they are frustrated over the long-delayed cleanup of the site, which was originally scheduled for completion in 1986 but will not begin for at least another year.

"It's always been a wait-and-see game," complained longtime resident Bob Campbell. "They make tests, they say 'Yes there are contaminants there' . . . and then the next thing you know, they're going to make more tests."

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BURRELLE'S

Cleanup plan to proceed

Officials discount Irvine's objections

By Marla Cone
The Register

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Criticizing the Irvine City Council as being unreasonable and blocking efforts to protect water supplies, Orange County water officials Wednesday decided to proceed with their plan to remove polluted ground water and use it to irrigate crops and public landscapes.

In the largest toxic spill in Orange County history, a large water basin underlying Irvine is contaminated with trichloroethylene, or TCE, a hazardous degreasing solvent.

The Orange County Water District believes the toxic chemical has flowed from the El Toro Marine Corps Air Station, creating an underground spill that stretches at least two miles.

The water district's board of directors rejected the Irvine City Council request to study the health risks further before removing the water and spraying it on fields.

District board member Noble Waite said Irvine officials were having a "hysterical response" and standing in the way of a cleanup needed to stop the chemical from spreading into drinking water.

"The (contamination) is going to spread further and you'll have TCE all over the place," Waite said. "We're going in there to help you people (Irvine residents) and you're throwing up roadblocks."

The hazardous chemical in the underground water poses no immediate health threat because Irvine's ground water is not used for drinking supplies.

But the water is valuable — especially in times of shortages and drought — and the pollutant is moving at a rapid rate toward

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SPILL: Cleanup to proceed

FROM 1

drinking-water wells that serve Santa Ana and Tustin, officials said.

By July, the water district expects to begin removing about 1 million gallons of TCE-polluted water daily and use it to irrigate crops, golf courses, municipal lots and other fields in Irvine. The irrigation would release an estimated three ounces of TCE into the air every day, the water district said.

A study commissioned by the water agency has concluded that using the water for irrigation "does not present any significant cancer or non-cancer risk" to Irvine residents.

The TCE that would evaporate into the air is less than one-millionth of the amount already found in the region's air because the industrial solvent is so widely used, the report concluded.

But council members, especially Mayor Larry Agran, say Irvine residents should not be exposed to any risk from the cleanup.

"We did not put the TCE in the ground. It is our bad fortune that it's running underneath the city of Irvine," said Frances Winslow, the city's emergency-management coordinator.

"The mayor's concern is that the citizens of Irvine are being asked to take whatever risk there may be to protect the region as a whole. The water district has a regional point of view. We have a city one."

Waite said the proposed cleanup is the safest and most cost-effective way to stop the chemical from spreading. Removing the TCE will pose a slight risk of breathing fumes no matter what method of cleanup is used, he said.

"If you're asking for zero (risk), forget it. It can't be done," he said.

Irrigating the fields with TCE-tainted water poses a risk of less than one cancer case per every 1 trillion people exposed, the report says. Health experts consider a risk of one in 1 million acceptable.

Board member Langdon Owen said he understands the city's concern, but added, "It's hard to proceed when we have this unreasonable request."

Agran was unavailable for comment Wednesday.

Orange County water officials are losing patience when it comes to the TCE cleanup because they detected the contamination in three Irvine agricultural wells four years ago.

Since then, the county water district and regional water officials have been trying to persuade the Marine Corps to use federal funds to clean it up.

The Marine Corps, however, has sought proof that it is reponsible for the spill. The water district decided to use its own emergency toxic-cleanup fund to pay for about $1.2 million in studies and cleanup costs.

The water-district directors suggested that if Irvine officials want the waste treated before it is used for irrigation, the city of Irvine should pay the extra cost. Treating the water with carbon filters would cost an extra $400,000 in capital expenses, plus $30,000 a year, the water agency estimates.

"We don't feel there's any benefit to be derived through treating the water. The risk is so small it's incalculable, so it seems a waste of money," said James Reilly, the district's director of water quality.

Winslow said Wednesday that she will ask the City Council, perhaps at its June 20 meeting, if it is willing to pay the filtering cost.

William Mills, the water agency's general manager, said the spill cleanup will continue unless the regional smog-control agency determines that the TCE would violate air-quality regulations.

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BURRELLE'S

The San Diego Union/Howard Lipin

Father Joe Carroll: 'I got in the business to help the homeless and the hungry, not to do contamination tests.'

Chemicals plague center for homeless

By Steve Schmidt, Staff Writer

San Diego's nationally renowned St. Vincent de Paul Joan Kroc Center is struggling to help the homeless downtown, but part of its efforts is going down the drain.

The shelter at 1501 Imperial Ave. has spent up to $1 million since late 1985 to battle a contamination problem that continues to plague its sewage system.

The ground water under the three-story center is tainted with two cleaning solvents, which have crept toward the site, possibly from nearby underground storage tanks.

Father Joe Carroll, director of the center, is upset because he is having to battle a problem he did not create.

"I got in the business to help the homeless and the hungry, not to do contamination tests, install water pumps," Carroll said last week. "This is insane.

"It's just an ongoing pain in the butt," the priest said.

The center spends $3,000 to $5,000 a month to monitor the contamination — money that Carroll said is being tapped from the center's annual $2.5 million budget.

Because the tainted ground water must pass through the city sewage system for treatment, city officials are asking the center to pay about $80,000 in delayed hook-up fees, or face being disconnected.

If the ground water was clean, it would be allowed to naturally flow into San Diego Bay.

Meanwhile, county and state environmental experts are trying to find out where the contamination is coming from.

The logical suspect is a nearby piece of property owned by California Laundry-Linen & Industrial Supply Co., according to Kevin Heaton, a hydrogeologist with the county hazardous materials unit.

Both chemicals found under St. Vincent's are cleaning solvents often associated with dry cleaning operations. The contamination does not imperil drinking water.

Cal-Linen executives declined to comment on the matter, noting that the issue was the subject of a lawsuit filed last year by the Roman Catholic diocese.

The diocese, which runs the 2-year-old center, has sued the city and Cal-Linen over construction delays and other problems that arose following the discovery of the tainted ground water in 1985.

Heaton said tests were conducted of the Cal-Linen site more than a year ago, but results were inconclusive.

New tests were made about two weeks ago. The results should be out in a few days.

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BURRELLE'S

More woes reported with selenium levels

Standard exceeded 10% of the time

By Lloyd G. Carter
UNITED PRESS INTERNATIONAL

Levels of the trace element selenium entering a segment of the San Joaquin River in farm-drainage water now exceed human drinking water standards about 10 percent of the time, the U.S. Geological Survey reports.

Selenium-tainted shallow ground water also may be percolating through the gravel casings of older or abandoned wells throughout the western San Joaquin Valley and threatening drinking supplies deep underground, the report said.

Some wells near the towns of Patterson and Crow's Landing in western Stanislaus County have selenium levels exceeding safety standards.

The 129-page report is a compilation of the last 2½ years of study by a team of state and federal scientists. It says 4.6 tons of selenium a year are entering the river in farm drainage and most of this mineral-laden drainage is recycled into the California Aqueduct, where it is reused on farms or sent south to Los Angeles for use as drinking water.

The report also suggests some of the worst selenium-tainted land in the western San Joaquin Valley should be taken out of production as a means of reducing both river pollution and rising levels of salty ground water in the western Valley. The river accounts for 83 percent of the selenium entering the Sacramento-San Joaquin Delta region.

A likely increase in problems

Unless farmers change their ways and adopt more efficient means of irrigating ground water, problems will continue to increase, the report said.

An already huge body of selenium-laced shallow ground water under the western Valley may have to be left where it is, the report said, and it would create more technical problems for farmers trying to continue production on salty land.

The report said a vast body of shallow ground water covering tens of thousands of acres in the western Valley has selenium levels ranging from 50 parts per billion to more than 3,000 parts per billion.

Selenium is the element leached from western San Joaquin Valley farmlands by irrigation practices and blamed for the poisoning of the aquatic food chain at the Kesterson National Wildlife Refuge evaporation ponds. Ducks and birds nesting at Kesterson have suffered mutations and lowered birth rates through most of the 1980s.

Selenium is actually a necessary micronutrient for humans and animals in minute doses but is toxic at slightly higher levels.

Federal scientists have been urging less water usage by western Valley farmers since the bird deformities were discovered at Kesterson in 1983. But the total volume of water delivered to the area hasn't declined.

The main crop grown in the western Valley is cotton, which is subsidized, requires intensive use of farm chemicals and is in surplus supply.

Environmentalists have argued that cotton grown on high selenium soils should be taken out of production but agribusiness interests oppose such suggestions.

Violations along San Joaquin

The Geological Survey report said the violations of the Environmental Protection Agency's drinking water standard of 10 parts per billion for selenium occur in a stretch of the San Joaquin River between Mud Slough and the confluence of the Merced River in Merced County.

The EPA standard for protection of the river's fishery at 5 parts per billion is exceeded in this area about 40 percent of the time. Dilution by the Merced, Tuolumne and Stanislaus rivers entering the San Joaquin from the east dilute the selenium levels below the EPA standard downstream of Merced County.

Mud Slough and Salt Slough, two tributaries of the river that deliver western Valley farm drainage to the San Joaquin, exceed the EPA drinking water standards about 40 percent of the time and exceed aquatic life protection standards 60 percent of the time. These sloughs traditionally have been used as sources of drinking water for livestock and wildlife refuges.

SOUTH BAY LEAKING TANKS: SOME MAJOR CASES

Since 1983, leaking underground storage tanks have been discovered at 187 locations throughout the South Bay, including 61 in communities that are part of the city of Los Angeles, 33 in Torrance, 24 in Carson, 17 in Gardena, 10 in Hawthorne, 9 in El Segundo and Inglewood, 5 in Lomita, 3 each in Hermosa Beach and Lawndale, 2 each in Manhattan Beach and Palos Verdes Estates, and 1 each in Rolling Hills Estates, Lennox and the Rancho Dominguez area. Twenty area leaks, nearly all involving solvents at industrial sites or gasoline at service stations, are among the 140 cases considered most serious by investigators at the state regional water quality board in Los Angeles. More than 1,300 leak cases have been reported countywide.

LOS ANGELES INTERNATIONAL AIRPORT 1 World Way, Los Angeles	Jet fuel up to five feet thick has contaminated ground water beneath the airport. Tests since discovery in 1987 have revealed "gross contamination" of a regional aquifer, apparently from leaks in underground pipes and huge above-ground storage tanks. Leaks from two nearby underground tanks have also reached the aquifer, and several other buried tanks have leaked. Pollution has not reached the area's drinking-water aquifers, investigators say. The airport says it will force testing of all 288 airport tanks and plans a multimillion-dollar cleanup of water and soil pollution.
BEE CHEMICAL CO. 1500 W. 178th St., Gardena	A subsidiary of Morton Thiokol, Bee has spent $700,000 to find the boundaries of a foot-thick ground water plume of industrial solvents it inherited when it bought the property in 1985. The contaminants, found at a depth of 40 feet, flow about 250 feet under neighboring companies that have given Bee permission to drill test wells. Bee plans to soon begin pumping and treatment of pollution on affected sites. Ten tanks and sumps have been removed, and storage of toxic fluids is being moved above ground to specially constructed areas. No drinking water wells have been affected.
NORTHROP CORP. 1 Northrop Ave., Hawthorne	Leaking tanks have been found on three occasions since 1986 at this 140-acre aerospace facility. The company, which has spent more than $1 million responding to the problem, has removed all 43 of its underground tanks and replaced 17 with containers that are double-walled and electronically monitored. Northrop has drilled 20 wells to assess the extent of ground water contamination and thinks pollution has not migrated off site. Plan for large-scale cleanup is being developed. City water wells are nearby, but they draw water from an aquifer about 300 feet beneath confirmed depth of pollution and separated from it by clay layers.
ELIXIR INDUSTRIES 18037 S. Broadway, Carson	Since 1984, this multi-product manufacturing company has been removing a variety of solvents once up to four feet thick. A worker still bails solvent full-time from the site's 80 monitoring and recovery wells. Shallow ground water is polluted but contaminants are confined by a thick clay layer about 40 feet beneath site, investigators say. Pollution apparently has not moved off site.
GTE 106 Pacific Coast Highway, Hermosa Beach	About 4,000 gallons leaked from a 6,000-gallon diesel tank for a standby generator. Company began recovery of fuel floating on ground water at depth of 80 feet in 1987, soon after the leak was discovered. Ground water in area is brackish and unsuitable for drinking. Cleanup continues.
ARCO STATION 23510 Crenshaw Blvd., Torrance	Thousands of gallons of gasoline were leaked in 1986 when a dipstick was punched through the bottom of a single-walled fiberglass tank, investigators say. Pumping to remove the layer of gas up to three feet thick has gone on ever since. Though found at a depth of 90 feet in an aquifer that provides drinking water in other parts of the South Bay, the pollution apparently has not affected water wells nearby. Cleanup is expected to continue for at least another year.
PACIFIC SMELTING CO. 22219 S. Western Ave., Torrance	Two toxic solvents were discovered in a regional aquifer in 1987 during tests to determine the extent of contamination from a leaking fuel tank. The company, which closed its facility last year, says it has never used the solvents—PCE and TCE, both suspected human carcinogens—at that location. Solvent contamination is an areawide problem, investigators confirm. No water wells have been affected. Analysis continues.
VSI AEROSPACE PRODUCTS 4001 Inglewood Ave., Redondo Beach	Gasoline and solvents have been found in shallow ground water, with the gasoline perhaps coming from another location. While attempting to define the extent of the problem, the company has pumped solvents from ground water, treated them and discharged them into storm drains. An overall cleanup plan is imminent, investigators say.
LOS ANGELES AIR FORCE STATION 2400 El Segundo Blvd., El Segundo	A state Superfund site, the station has been contaminated by a variety of sources during the last 40 years, the Air Force reports. In a 1977 incident, 26,000 gallons of fuel oil leaked from an underground tank. Solvent contamination from a below-ground brick sump was discovered recently. Tests to determine whether ground water has been contaminated are scheduled for this year. Drinking water wells, about a mile away, have not been polluted.
DOUGLAS AIRCRAFT CO. 19503 S. Normandie Ave., Los Angeles	A variety of industrial solvents have been found in five monitoring wells both up-gradient and down-gradient from leaking tanks. Analysis is continuing in this 1987 case, and the company says it is not yet sure of the extent of the problem. No determination has been made on whether contaminants have moved off site. Regional water basins, separated from known contamination by confining clay layers, have not been tested, state investigators say.
UNOCAL STATION 1301 Redondo Beach Blvd., Gardena	A layer of gasoline three feet thick was discovered on ground water 40 feet deep as two 10,000-gallon tanks were removed this spring. Case was referred by county to state water quality control board, where evaluation is pending.

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SEP 8 1988
BURRELLE'S

Toxic Leaks Feared at Livermore Lab

Chronicle East Bay Bureau

Contaminated water may have leaked from cracks in the sewer system at the Lawrence Livermore National Laboratory two years ago, according to a study by the Department of Energy.

Early findings showed that thousands of gallons of water, possibly tainted with toxic substances, were unaccounted for during parts of 1986 when the study was conducted.

The study tracked water coming into the lab and flowing out later through its 50-year-old sewer system. Although the possibility of a toxic leak existed, investigators reported finding no contaminated ground water at the site.

Investigators suggested that the sewer lines may be faulty due to aging, corrosion and quake activity, according to Energy Department officials.

Those officials yesterday downplayed the possibility of a serious contamination problem as a result of any possible leaks.

"We have discussed the situation with lab officials and at this point we feel there is a very small amount of water unaccounted for," said Will Callicott, a DOE spokesman in Washington.

But Larry Kolb, principal engineer for the Regional Water Quality Control Board, said the faulty sewer lines could be hazardous if leaks occurred away from the lab site.

"I'm not surprised this sort of thing turned up, since there has been a lot of industrial site activity (there) in recent years," said Kolb, who was awaiting a copy of the full report from lab officials before making further comments.

According to the DOE, Lawrence Livermore has launched a sewer repair program costing between $2 million and $3 million.

The report of the potentially hazardous leaks follow a series of mishaps and controversies that have plagued the 35-year-old weapons facility for the past several years.

In 1986 the site was placed on the list of the nation's worst toxic waste sites. The next year, top lab officials were accused of aborting an investigation into drug use there after an undercover probe indicated as many as 100 workers would be arrested as a result. Ultimately, six workers were arrested and 10 others were forced to resign.

This month, officials discovered defects in the plant's electrical system following a June 30 explosion and fire. The cost of upgrading that out-of-date system is estimated at nearly $40 million.

Lab officials were unavailable for comment yesterday.

Toxic plume taints 2 more water wells

ET CRIMINAL

■ Likely well polluters in Chico identified, A2

By CARLOS CORDOVA FRONT PAGE
Bee staff writer

Two more tainted water wells have been shut down in north Fresno and a plume of contamination now stretches 2½ miles south from Pinedale past Shaw Avenue.

A Fresno County Waterworks well near Sierra and Fruit avenues and another near Shaw and Palm avenues were shut down during the weekend after tests revealed contaminants above state health guidelines, county health officials reported Tuesday.

Tests showed levels of the solvent trichloroethylene — TCE — at 21 parts per billion in the Sierra and Fruit well. Dichloroethylene — DCE — was found at 16 ppb in the Shaw and Palm well.

In drinking water, state health guidelines call for a maximum of 5 ppb of TCE and a maximum of 16 ppb of DCE. DCE is a byproduct of trichloroethylene.

Gary Carozza, county environmental health director, said the contaminants in the two wells should not have an effect on water users. The state health guideline levels for TCE and DCE are predicted to cause one extra cancer in every million people who drink about a half-gallon of water a day for a 70-year lifetime.

David Duncan, assistant county waterworks manager, also said

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FRESNO BEE

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shutdown of the two wells will not affect water delivery. He said the water system in the area was designed above capacity in anticipation of future annexations and growth.

The shutdown of the two wells brings to six the number of wells that have been turned off since TCE was discovered at the former Industrial Waste Processing Co., 7140 N. Harrison Ave., in May.

IWP was a chemical distributor and metal and solvents recycling business. During recycling, several chemicals leaked or spilled onto the ground. The company also left behind several hundred deteriorating drums of waste solvents and lead solder.

Traces of TCE also have been found in the soil of the Vendo Co., 7209 N. Ingram Ave., in the Pinedale area.

The Central Valley Regional Water Quality Control Board has asked Vendo and the Environmental Protection Agency, which cleaned up the abandoned IWP property, to install wells to test ground water below the two sites.

Until those tests are done, it will not be known whether the two businesses or a former U.S. Army base in the area and a Pinedale landfill contaminated the six wells.

Carozza said the size of the plume indicates more than one source may be responsible for the contamination. The problem is further complicated because the plume is in an old San Joaquin River stream bed and contaminants may be getting channeled south from the Pinedale area, Carozza said.

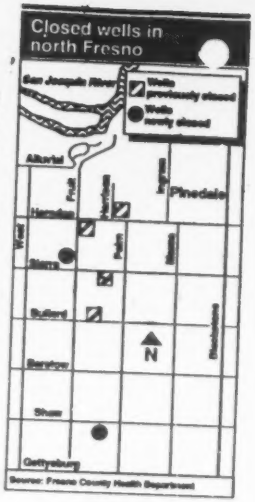
Duncan said it also is possible that the contaminants may already have existed at the two wells just shut down.

The county, city of Fresno and Pinedale Water District have formed a task force to study the ground-water contamination in the area and to come up with solutions.

A treatment process is being funded to remove TCE from the most contaminated well at Harrison and Locust avenues, near the IWP site. That well showed 333 to 405 ppb of TCE in tests done in May.

The contaminated water would be pumped from the ground and the TCE stripped away in a tall tower filled with screens. The water then would be shot out with forced air and dumped in a water basin at Maroa and Herndon avenues.

Duncan said the purpose of the treatment is to remove the contaminants and keep them from moving south down the plume.



Fresno Bee/Debbi Soligian

ORANGE COUNTY REGISTER

SANTA ANA, CA
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SATURDAY
JUL 2 1988

BURBELLES

630 FB

Stringfellow cleanup could cost $680 million

By Marla Cone
The Register

Cleaning up Riverside County's Stringfellow Acid Pits, one of the worst toxic-waste dumps in the nation, will cost as much as $680 million and take at least 55 years, according to a new report.

The report, released Thursday by the state Department of Health Services, outlined five strategies for eliminating the chemical waste, ranging in cost from $111.4 million to $680 million.

The Stringfellow project will be the most expensive toxic-waste cleanup so far in California and perhaps in the nation, said Jan Meyer, a senior hazardous-materials specialist with the state health department.

About 34 million gallons of liquid industrial wastes, including the pesticide DDT, PCBs and several cancer-causing solvents, were dumped in the landfill by more than 200 companies before it was closed in 1972.

The 17-acre Stringfellow site is on the nation's Superfund list of dangerous dump sites. It is one of the most infamous sites on the national list because a wide variety of hazardous chemicals has contaminated private water wells in the town of Glen Avon in western Riverside County. The toxics have seeped underground at least two miles from the dump.

The site contains about 1 million cubic yards of contaminated soil and more than 20 million gallons of polluted ground water.

■ **WEAPONS:** Cleanup at nuclear plants will cost billions/**20**

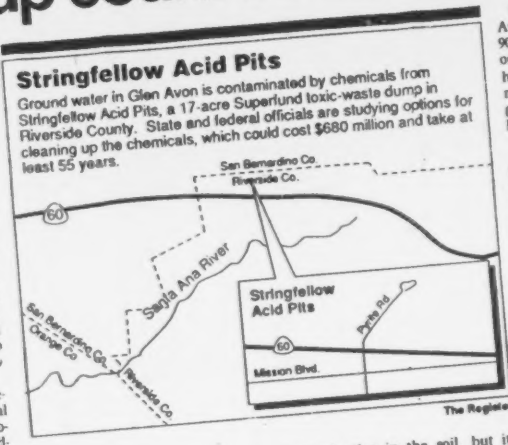
The chemicals in the soil and water — totaling more than 80 different toxic compounds — slowly are moving west. If left unchecked, eventually they could threaten water basins in Chino, Riverside and even Orange County, 20 miles away.

The only sense of urgency, however, is for the residents of Glen Avon, water-quality officials said. The state has provided several hundred residents near the dump with bottled water for the past few years.

In October, the state health department and US Environmental Protection Agency, which are coordinating the cleanup, are scheduled to announce their preference among the five cleanup options. After a two-year study, the five were chosen by state health officials from a field of 86 technologies.

The cheapest option would cost $111.4 million, but would take an estimated 440 years to adequately remove the toxic waste. The option would allow ground water to flow at its natural rate and be pumped by wells and purified.

The most expensive option, at $680.1 million, would require excavation of all 1 million cubic yards of soil. It would then be incinerated. That solution would take 63 years.


Stringfellow Acid Pits
Ground water in Glen Avon is contaminated by chemicals from Stringfellow Acid Pits, a 17-acre Superfund toxic-waste dump in Riverside County. State and federal officials are studying options for cleaning up the chemicals, which could cost $680 million and take at least 55 years.
San Bernardino Co.
Riverside Co.
60
Santa Ana River
Stringfellow Acid Pits
Pyrite Rd
San Bernardino Co.
Orange Co
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Mission Blvd.
The Register

A $343 million variation of that plan would require removal of about 300,000 cubic yards of contaminated "hot spots" and incineration of the soil. Cleanup would take 55 years.

The other two options involve no excavation but include engineering systems, such as gas-extraction, flushing or tunnels, that squeeze the pollutants out of the soil. A $167.5 million option would clean up the soils within 62 years, while a $134.7 million one would leave the contamination in the soil, but it would have no contact with the water table, which would be lowered.

"They are all viable options. That is why they're still in the report," Meyer said.

Cleanups of contaminated soil and water are extremely expensive and time-consuming because the various pollutants flow slowly, and extracting them from the water basin through pumping or other processes is tedious and slow, Meyer said.

Community leaders from Glen Avon and surrounding areas have 90 days to submit their comments on the proposals. They already have rallied to oppose the cheapest methods, saying they want the ground water cleaned up as quickly and thoroughly as possible.

Each cleanup option includes a $77 million plan to install 21 wells to capture, treat and recycle Glen Avon's drinking water. The process would take 10 years to make the water safe to drink, the report said.

As a temporary solution to stop the chemicals from spreading, the EPA since 1985 has been pumping contaminated ground water out of the pits and treating it in a neutralization plant the EPA built next to the dump.

The treated waste water then is discharged into Orange County's sewer lines, which empty into the ocean off Huntington Beach. By the time the waste water is released into Orange County's sewage system, it is almost as clean as tap water, according to Corinne Clawson of the Orange County Sanitation Districts.

About 35,000 gallons of treated Stringfellow waste are discharged into the county's sewer system each day — a tiny percentage of the total of 2[illegible] billion gallons of waste water per day that flow through the system.

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Gasoline fouls groundwater in Huntington

ORANGE COUNTY REGISTER
SANTA ANA, CA
SATURDAY 347,723
MAY 20 1989
BURRELLE'S
639 OF

By Maria Cone
The Register

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Large pools of gasoline have polluted shallow groundwater under two adjacent Huntington Beach businesses, and county health officials said Friday that Mobil Oil is moving too slowly in complying with an order to clean up its part of the water contamination.

High concentrations of benzene, a cancer-causing substance in gasoline, have contaminated water under the Red Carpet Car Wash and a Mobil station at Beach Boulevard and Edinger Avenue, said Bob Merryman, Orange County's environmental-health director.

The fuel apparently came from both businesses, which had leaky underground storage tanks that have been removed, Merryman said. The gasoline poses no immediate health risk, but the companies have been ordered to clean it up before it spreads into nearby drinking-water supplies.

An investigation and cleanup by Red Carpet Car Wash at 16061 Beach Blvd. is about on schedule, Merryman said, but he said Mobil has failed to comply with a cleanup order issued 1½ years ago.

On Tuesday, the health office sent Mobil a notice of violation, issued when a company has been uncooperative and has had several warnings, he said. Mobil found the leaky tank in September 1987, according to county records.

Ralph Edwards, environmental manager for Mobil Oil, based in Burbank, said Friday that he had not received the violation notice. He said he was unable to immediately provide details on the company's investigation of the spill because the company's legal division apparently had the file.

Three drinking-water wells serving Huntington Beach are within a half-mile of the gasoline, but recent tests by the Orange County Water District detected no contamination.

The Register

Underground fuel tanks are the biggest risk to the safety of Orange County's groundwater supply, which serves about 25 percent of the water needs of the county's residents. More than 800 leaky fuel tanks have been discovered as companies comply with a 1983 state law requiring inspection of the containers.

Drinking water is drawn from depths of 125 feet to 285 feet in Huntington Beach. The contamination begins at a depth of 10 feet, but the thickness of the gasoline layer is unknown.

Benzene, which has been documented to cause leukemia in some factory workers, was found in a concentration of 11,000 parts per billion in groundwater under the car wash. The state standard for drinking water is 0.7 ppb; anything higher is considered an unacceptable health risk.

The concentration of benzene is the second-highest found in Orange County in the past five years.

If a company ignores a violation notice, the county health office might contact the District Attorney's Office and pursue civil charges.

EPA says water in 38 states tainted from pesticides

HERALD EXAMINER
LOS ANGELES, CAL.
D. 240,232 SAT. 188,421
SUN. 200,377

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WASHINGTON (AP) — Ground water has been contaminated by pesticides in parts of at least 38 states, the Environmental Protection Agency said yesterday.

In an interim report which noted that many areas remain to be sampled, the EPA said the pollution was caused in 26 states by 46 different pesticides used on farms.

It said an additional 28 chemicals, from unknown sources, were to blame in the 12 other states.

Concentrations were generally below the health-advisory levels the EPA has proposed for drinking water, and the agency said not all the contaminated ground water sources were used for drinking.

The EPA said it had identified 32 of the 74 chemicals, in instances of contamination in 12 states, from a "point source" such as an accidental spill, equipment rinse-water runoff from a site used for pesticide mixing or back-siphoning into wells during irrigation.

The EPA's findings were derived from a study of 150 ground water analyses over the past 10 years conducted by government agencies, universities and holders of pesticide licenses.

The agency said it was still checking the validity of those studies through interviews with the authors. Only about half the interviews have been completed, EPA said.

"There are dangers" in trying to draw national conclusions from the data, which are "not appropriate for assessing human exposure," said Victor Kimm, acting assistant administrator in charge of pesticides.

"Many agricultural areas have not been sampled and are not statistically represented," he said.

For decades farmers and others thought pesticides would not get into ground water, but would bind to the soil or break down into harmless chemicals.

It was 1979 before the first pesticides were found in ground water in California and New York.

Since then, concern has mounted rapidly, and recent surveys in Iowa have shown that pesticides could be in up to half the state's 800 municipal wells.

In February, the EPA announced a proposed ground water-pesticides policy that would, among other things, let states with approved programs make their own decisions about using pesticides in areas where the agency would otherwise forbid use.

At the time, 19 pesticides from farming had been found in the ground water of 24 states.

The agency said it expects to adopt the strategy formally early next year.

In April, EPA began searches for 125 pesticides in a nationwide sample of 1,300 drinking water wells. Results are expected in late 1989 or 1990.

Ground water provides half the nation's drinking water and a far higher share in rural areas.

The EPA announcement "doesn't suprise me," said Diane Baxter, staff scientist of the National Coalition Against the Misuse of Pesticides.

"This is the tip of the iceberg. As more samples are taken, we are going to find more instances of contamination," Baxter said.

John McCarthy, vice president for science and regulatory affairs at the National Agricultural Chemicals Association, a pesticide manufacturers' trade group, said: "We quite agree with EPA that this is not appropriate for assessing human exposure. EPA's current sampling is the kind of information we will look to as to whether there's a health issue."

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CONTAMINATION IN ORANGE COUNTY

These are the major cases of contamination resulting from leaking underground storage tanks in Orange County. Cases are listed chronologically.

■ **Rockwell International,** Newport Beach—In January, 1984, waste solvent tanks installed when the plant was owned by Collins Radio Co. were reported to be leaking. The amount of leakage was unknown. Contamination of soil and ground water was judged to be extensive. Tanks were removed. Soil vapor extraction has been under way since October, 1984. About 10 million gallons of ground water have been extracted and cleaned. There is no estimate of when cleanup will be completed.

■ **Marine Corps air stations,** El Toro and Tustin—Irrigation wells west of the El Toro base show contamination from TCE, a solvent used for degreasing machinery and a suspected carcinogen. County and state officials assume the contamination came from the military base, which used large quantities of the solvent until 1975, but they are unsure whether it came from underground tank leaks.

There are about 200 underground tanks at the El Toro base, about 73 at the Tustin base, most holding jet or diesel fuel. The first tank leak was reported in July, 1986. So far, there are five cleanup operations under way at El Toro, two at Tustin.

County officials complain that progress is slow and that legally required monitoring systems have not been installed. Marines blame the slow pace on the difficulties in contracting work for so many tanks. The El Toro cleanup has been nominated for federal Superfund designation, which would bring federal Environmental Protection Agency oversight of the project.

County officials say the situation has not been assessed sufficiently to determine the extent of contamination. Marine officials have permitted county and state inspection of their tanks but insist that the county has no authority to charge fees in this case and have refused to pay.

They have also refused to comply with a state order to assess contamination outside the base boundaries but have informally agreed to reimburse the Orange County Water District for such a study if it finds that the base is responsible for the contamination. So far, the district has found TCE contamination as deep at 500 feet in wells drilled off the base. The district's final report is due in December.

■ **Rainbow Disposal,** Huntington Beach—In September, 1986, it was reported that at least 108,000 gallons of diesel fuel had leaked from a ruptured underground line. Rainbow officials at first had suspected the missing fuel was being stolen. Contaminants have been found in the soil, floating atop the ground water and dissolved in slight amounts in the ground water. The ruptured line has been repaired, and floating fuel is being pumped to the surface. Consultants say the contamination has remained under Rainbow Disposal's property. A cleanup plan has not yet been proposed.

■ **McDonnell Douglas Astronautics,** Huntington Beach—In October, 1986, it was reported that a concrete waste tank was suspected of leaking a mixture of solvents. Contamination was judged to be "highly concentrated" in soil and ground water. The tank was removed and assessment of the contamination has begun. There are no definite findings yet and no estimate of when cleanup will begin or be completed.

■ **Reliance Universal,** Brea—In December, 1986, it was reported that extraction fittings on tanks were defective and were slowly leaking a mixture of contaminants over perhaps 20 years. Contamination of soil and ground water was judged extensive. Contaminants floating atop the ground water are being pumped to the surface and recycled. Permits to extract contaminated ground water are being sought.

Test wells have found no contamination beyond Reliance property boundaries. There is no estimate of when pumping will begin, but county officials expect that once started, pumping could continue seven or eight years. Company officials say less time may be required.

Crude oil has also been found, suggesting an oil pipeline leak off the site. The regional water board has ordered an investigation of the former Unocal petroleum tank farm nearby as the possible source of the oil.

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SACRAMENTO, CALIF.
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FEB 2 1989
BURRELLE'S

Forgotten in Oroville

E 58 EDITORIAL

Although test results released last week showed dioxin levels in Oroville residents 2 to 8 times higher than normal, state Health Services Director Ken Kizer says those levels are not high enough to cause any short-term health problems. Whether there might be long-term problems, he says, can't be predicted from the data in hand.

With that pronouncement, Kizer returns the victims of one of the worst cases of dioxin contamination in the state to the same limbo they have occupied since even before April 1987, when a fire at the Koppers Co. wood preserving plant sent a dioxin cloud across a wide area of their community.

Contamination problems at Koppers date back to 1973, when traces of PCP were found in soil and groundwater around the plant. In 1984, Koppers was declared a federal superfund site. Yet the community's elected representatives — including Rep. Wally Herger, state Senator Jim Nielsen and Assemblyman Chris Chandler — have done little or nothing to prod government to clean up the mess or even to answer the questions of the people affected.

In the wake of the 1987 fire, the government collected chickens and eggs from the area for testing, but almost a year passed before the tests were done — confirming that the home-grown food, on which many in this low-income community had depended, was contaminated. When the state finally got around to testing the people who'd been eating this food, those results weren't reported for another eight months.

State health officials believe that air monitoring might help pinpoint where the dioxin is coming from, but although it's now nearly two years since the Koppers fire, no monitors are yet in place. Meanwhile, with each report of contamination, land values have sunk further. At this point, many local residents couldn't sell at any price.

Nonetheless, the only delays that the community's elected officials seem to have complained about were when state health officials briefly prevented the reopening of the Koppers plant after the fire. Local politicians, in fact, have sent a clear message to health and environmental officials at all levels of government: No health considerations and no environmental considerations outweigh the economic benefits Koppers represents to the area. And the bureaucrats, bending to political pressure, have responded — or more accurately, failed to respond — in just the way the politicians have dictated.

The people living near the Koppers plant need answers and assistance. If it had been a more affluent group of residents who had been faced with this threat, it's hard to believe their representatives wouldn't have gotten them that help a long time ago.

San Bernardino wells face new pollution threat

587 Groundwater

By GARY POLAKOVIC
The Press-Enterprise

SAN BERNARDINO — Creeping chemical contamination has struck this city's water wells again.

A toxic stream migrating from an unknown source in the northern part of the city threatens two key wells. City officials said that unless they spend thousands of dollars on treatment devices, they could be forced to shut down the wells.

Underground solvent pollution is widespread in the Bunker Hill ground water basin. Riverside ...s about 75 percent of its drink...g water from the basin, though its wells do not appear to be in immediate danger.

At one point last year, 14 San Bernardino wells were closed because of unsafe levels of cancer-causing trichloroethylene (TCE) and perchloroethylene (PCE).

Four of those wells reopened in May when two, 40-foot-tall purification towers were built to wash the dirty water. That work cost $1.3 million.

"What we're finding in this basin is you can run, but you can't hide," said Joe Stejskal, director of engineering, construction and maintenance for the San Bernardino water department.

The latest chemical threat has been bearing down on wells along Sierra Way near 16th and 17th Streets for the past three years.

The two wells provide about 4½ million gallons of water daily, or 5 percent of San Bernardino's water supply.

Toxics are within allowable concentrations, but Stejskal said ...ples gathered this year show increasing amounts of chemicals in the wells.

TCE has been found at 4 parts per billion units of water.

BECKY HAGEMAN/The Press-Enterprise

PCE has been detected at up to 1.8 parts per billion.

TCE is considered dangerous when it exceeds 5 ppb. PCE is unsafe at 4 ppb, though the state is trying to lower the allowable level to 2 ppb.

Both chemicals have been widely used as industrial degreasing agents for aircraft and auto repairs and dry cleaning.

Stejskal said the San Bernardino water department board is expected to begin requesting bids next week to build a $600,000 water treatment plant.

Water from the two wells would be flushed through charcoal filters to remove pollutants. The dirty filters would have to be periodically disposed in a hazardous waste landfill, Stejskal explained.

The nearest Riverside well is about a mile and a half southeast

(See WELLS, Page B-2)

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Wells . . .

(From Page B-1)

of 17th Street and Sierra Way, said Ken Anderson, water systems operations manager for the Riverside Public Utilities Department.

If the contamination goes unchecked, officials say it might reach the Riverside well in a few years.

"We support what San Bernardino is doing wholeheartedly," Anderson said. ". . . If you take it out of the ground, we know we're not going to be subject to it and it will probably not reach our well," he said.

Most of the money for work in the Bunker Hill basin is coming from the state's $100 million hazardous waste cleanup account.

The source of contamination in the Bunker Hill basin has eluded toxic investigators for the past several years.

Studies show the pollution may be coming from a wide variety of small sources. But local water quality officials suspect a three-mile, underground toxic stream is leaking from a former midnight dumping operation near California State University San Bernardino, or possibly a World War II military prison camp in the same area.

"We just don't know where it's coming from," said Wael Ibrahim, waste management engineer for the state health department.

The state expects to begin a thorough investigation of the Bunker Hill basin, including contamination in Redlands and Norton Air Force Base, later this year, Ibrahim said.

Four of San Bernardino's polluted wells on Newmark Avenue are expected to join the Superfund program administered by the U.S. Environmental Protection Agency.

Oroville toxic cleanup: $37 million

By Jim Haynes
Bee Staff Writer

Koppers Co. estimated Monday it may cost the company as much as $37 million and take 20 years to clean up toxic pollution from the wood treatment plant site in Oroville.

The estimates were contained in a draft feasibility study done by the company under direction of the U.S. Environmental Protection Agency.

The company has signed an EPA consent order to clean up soil and groundwater at and around the plant contaminated by suspected cancer-causing pentachlorophenol, or PCP, and other hazardous compounds.

An estimated 1.5 billion gallons of groundwater and 175,000 cubic yards of soil must be treated to remove the pollution, according to the feasibility study.

Traces of PCP, which Koppers used to treat utility poles, railroad ties and other lumber to slow rotting, were first detected in soil and water around the plant in 1973.

The site was placed on the EPA's national priorities list as a Superfund site in 1984.

The PCP pollution is separate from another investigation under way by the state Department of Health Services of dioxin contamination in backyard chickens, eggs and beef in the vicinity of the plant.

An April 1987 chemical fire at the Koppers plant is a suspected but unconfirmed source of the dioxin contamination.

Koppers officials have agreed the company is responsible for the PCP contamination resulting from past wood treatment operations.

The company is responsible for the full costs of the treatment. Those costs could run as high as $37 million, although some alternative cleanup methods would cost several million dollars less, according to the study.

The EPA must approve of the remedies to be taken by Koppers

See KOPPERS, page B2

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Koppers

Continued from page B1

from among the alternatives outlined in the study.

"There is no such thing as a cheap alternative," Koppers spokesman Steve Smith said.

"It's not the kind of a thing you get much of a payback from, but the company has recognized it has the responsibility," Smith said.

He added that the soil can be cleaned up within 10 years, but that it may be 20 years before treatment of the tainted water is completed.

Under the cleanup plans, contaminated groundwater at the plant and in an area extending two miles south will be extracted and biologically treated with bacteria to decompose the PCP.

The only alternatives discussed in the feasibility study are whether the treated water will be discharged to the surface or fed back underground via nearby recharge wells.

The soil contamination, which was confined to nine specific areas on the plant site, will be handled by one or a combination of several cleanup methods.

Those alternatives include biodegradation of the soil in the original site or excavation and washing of the soil. Some tainted soil may be capped or contained in an on-site landfill.

PCP-contaminated soil will not be moved to a landfill elsewhere, according to the study. But soil contaminated with arsenic, chromium and copper could be moved to an off-site landfill, the study concluded.

Although no illnesses have been directly linked to the PCP-contaminated groundwater, the EPA has said there was the potential for a small increase in cancer.

The statistically small risk was defined by EPA officials as such that a person would have a 1-in-10,000 chance of contracting cancer if he drank two liters of the water each day for 70 years.

Most of the residents in the semi-rural area around the Koppers plant no longer drink the water from their wells.

Koppers several years ago paid for a water line to serve the affected homes with water from the Wyandotte Irrigation District.

Public hearings will be held sometime this spring before the EPA reaches a decision on how the company should proceed with the cleanup of the PCP-tainted soil and water.

In a related matter, the state Department of Health Services scheduled a public meeting for Wednesday to discuss the agency's continuing investigation of dioxin-contamination in the south Oroville area.

The meeting is slated for 7 p.m. in the Feather River Senior Citizens Center in downtown Oroville.

'Milestone' accord reached to track laboratory cleanup

Removal of polluted ground water estimated to cost up to $200 million

587

By John Miller
The Tribune

LIVERMORE — Two federal agencies yesterday announced a precedent-setting agreement with the state Department of Health Services to monitor clean up of ground-water pollution around the Lawrence Livermore National Laboraory.

The agreement ensures that the $70 million to $200 million cleanup proposed by lab officials meets state standards. The federal Department of Energy will reimburse the state up to $5,000 for monitoring the cleanup.

The other parties to the agreement are the California Regional Water Quality Control Board, which also is responsible for protecting ground water, and the Environmental Protection Agency.

The Federal Facility Agreement announced yesterday is the first one in California involving a "Superfund" cleanup site. The nuclear weapons research facility is on the federal Superfund list of the most seriously polluted sites in the country requiring immediate corrective action.

Site tainted in '83

The laboratory discovered in 1983 that groundwater beneath the site was contaminated with the organic compounds tetrachloroethylene and trichloroethylene, which are known to cause cancer in animals.

By drilling monitoring wells, lab scientists discovered the toxic plume has moved about 2,000 feet to the west and is within about three miles of three municipal water wells that serve about 40,000 Livermore residents, lab officials said.

Because the plume moves so slowly — about 100 feet a year, lab scientists believe — the lab says it will clean up the plume before it can reach the wells. Tentative deadline for total cleanup is 2015, according to lab project manager Fred Hoffman.

He said the laboratory has so far spent about $18 million on the problem, including drilling more than 250 monitoring wells and on investigating various cleanup methods. He said the laboratory will spend an additional $13 million over the next two years.

According to DOE spokeswoman Carol Powell, the pact provides a framework for the four agencies to "closely monitor all investigation and cleanup activities" at the laboratory.

Agreement hailed

It spells out a timetable for cleanup, penalities for missing cleanup deadlines, and designates the EPA as the final arbiter of any disputes among the agencies.

Bob Borzelleri, spokesman for the state health department, said the agreement is important to the state because "for the first time we will be able to recover from the federal government, our costs of cleaning up a Superfund site on federal property."

Terry Wilson, EPA spokesman, called the agreement a "milestone," saying it spells out how each agency will address a Superfund site cleanup at a federal facility.

According to the agreement, the laboratory must complete a report describing the extent of the contamination by Oct. 1, 1989, and must complete a draft feasibility study evaluating cleanup alternatives by May 1, 1990.

Those reports will be reviewed by EPA and state agencies and once cleanup has started, the state will monitor the effectiveness of the cleanup operation.

The public will have 45 days to comment on the report, beginning Nov. 15. Copies will be available at the Livermore Library, the laboratory visitors' center and the EPA's San Francisco office.

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RIVERSIDE, CA
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Polluted water found

587 groundwater

Contamination from March Air Force Base

By GARY POLAKOVIC
The Press-Enterprise

Toxic pollution from March Air Force Base has poisoned another residential drinking water well next to the base, officials said yesterday.

The Air Force provided bottled water to one home using the well shortly after the pollution was discovered two weeks ago.

"I about fell over when they told me," said David Nielsen, who along with his wife and daughter have been drinking the water for three years.

"The water in my toilet has a greasy film on it. It doesn't bother me, but then I got to thinking what this could do to my health," he said.

It is the fourth time in two years cancer-causing chemicals have been found in private wells one mile east of the base. Dangerous chemicals also forced the base to close its own wells four years ago.

Samples from the Nielsen well taken in June showed trichloroethylene (TCE) at 17 parts per billion — more than three times the state's health-based standard.

The contamination was just as much a surprise to military and water quality officials.

"No one knew this well was out there," said Steve Overman, a sanitary engineer for the Santa Ana Regional Water Quality Control Board.

"We just don't have a very good idea where the contamination is out there," he said.

Air Force officials declined to comment on the pollution discovery.

The well was found during an investigation of toxic pollution at the base.

In the past five years, the Air Force and the water quality board have identified 28 contaminated sites on the 11-square-mile base. The agencies are working on a comprehensive cleanup plan.

Seven of the sites appear to be the most likely sources of ground water pollution. They include abandoned landfills, fuel pits, solvent tanks and fire training areas used during 40 years of military operations, according to Air Force-sponsored reports.

To protect people from pollution, Overman said the Air Force must install more test wells just east of the base to track the underground movement of chemicals.

At least six and as many as 12 wells are located within one mile of the base's eastern boundary. Another 70 or so wells are immediately south of the base, most of which are used for agriculture or by single households.

Researchers count 31 pesticides fouling California ground water

By Emilia Askari
Herald Examiner staff writer

California, producer of more fruits, vegetables and other agricultural crops than any other state in the union, also holds the title for widest range of pesticides found in its ground water, a report released yesterday said.

The report by the California Public Interest Research Group is based on information provided by 34 states to the Environmental Protection Agency in Washington, D.C. The rest of the states do not regularly test for pesticide contamination, said David Bunn of CALPIRG.

He said his group based its

Water, A-11 ▶

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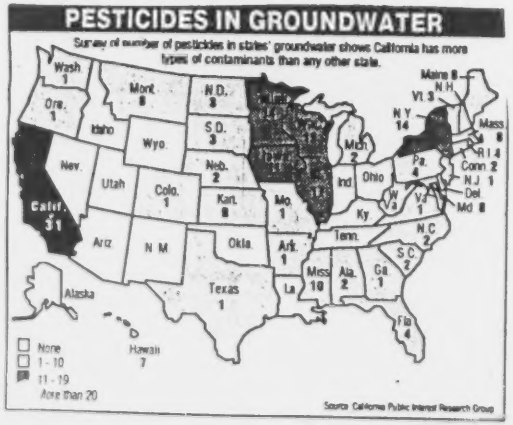

Water

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report on preliminary state-generated figures from the EPA.

The federal agency is in the middle of conducting its own comprehensive survey of drinking-water wells. Officials there cautioned that the figures in yesterday's report may not be comparable from one state to another.

Nevertheless, CALPIRG says Californians should be concerned by the preliminary information.

"We're up there at the top" of the list of states with pesticide leakage into its underground water table, Bunn said.

Ground water often is pumped up to the surface and used to quench the thirsts of California's people and crops.

Trace amounts of 31 insect-killing chemicals have been found in California ground water, according to the CALPIRG report. By comparison, other states with high concentrations were Illinois, which found 17 potentially harmful pesticides in its ground water, and Minnesota, with 14.

Exposure to large amounts of the chemicals over long periods of time could have adverse health consequences, according to the research group.

They range from birth defects and cancer to such relatively minor inconveniences as dizziness and stomachaches, CALPIRG added.

The group describes itself as "the state's largest membership non-profit advocacy organization working for environmental protection, consumer justice and governmental accountability."

The release of its report narrowly — and strategically — precedes a pending debate in Congress on several bills that would help prevent future seepage of pesticides into the nation's ground water.

"We need a national groundwater policy that stops further contamination," said Bunn. "I think what the public ought to do is write their congressional representatives to get this public policy in place."

California already has a state law that attempts to control infiltration of its ground water by the estimated 400 million pounds of pesticides that are spread over the state's soil every year.

Under state law, the California Department of Food and Agriculture is charged with collecting information on wells that have been tested for pesticides.

Jan Wessel, the department's communications chief, says she isn't sure where the EPA got the figures analyzed by CALPIRG. She provided statistics that show there may be fewer pesticides involved.

Last year, she said, wells in 19 of California's 54 counties were tested for pesticide contamination. Traces of the insect-killing chemicals were found in the wells of 14 counties, she added.

Sixteen different pesticides were found in the wells, she said, and of those, eight of the chemicals came from non-agricultural sources such as industry or homeowners.

Of the seven remaining pesticides found last year in California's drinking water, three are no longer in use, Wessel said. The others were present in amounts acceptable under state and federal guidelines, she added.

In Los Angeles County, two wells were sampled last year. Both were found to contain "acceptable" levels of altrazine, a chemical used to kill roadside weeds, Wessel said.

EPA spokesman Al Heier said yesterday afternoon that he couldn't immediately cite the source of the California numbers in CALPIRG's report. But, Heier added, "We think that ort is pretty accurate."

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DWP Yard Suspected in Pollution of Water Wells

By MYRON LEVIN, *Times Staff Writer*

The Los Angeles Department of Water and Power, whose North Hollywood water supply wells are targeted for cleanup under the federal Superfund program, is itself under investigation by the state for possibly contributing to the pollution.

By order of state water quality officials, the DWP will test soils beneath its big east San Fernando Valley maintenance yard at 12370 Saticoy St. South in North Hollywood for chemical and fuel contamination.

If significant soil contamination exists, the DWP may have to test ground water under the site, about a mile uphill from several chemically tainted wells.

A finding that it had contributed to ground water pollution would embarrass the DWP, which is a major beneficiary of Superfund cleanup funds and which has been delegated a key role in the multimillion-dollar North Hollywood cleanup by the U.S. Environmental Protection Agency.

The cleanup is intended to remove traces of chemical solvents from water supply wells. The most polluted wells have been shut down so that customers receive water that meets health standards.

Seepage Pit Found

The investigation follows two visits last fall by California Regional Water Quality Control Board inspectors, who reported seeing stained soil near fuel and chemical storage areas and a 25-foot-deep seepage pit at the maintenance yard, where the DWP does welding and vehicle repairs and coats water pipe.

"We're pursuing this as a 'priority one' investigation," said David Bacharowski, environmental specialist with the water quality board in Los Angeles.

"That means there's a high potential for ground water contamination, based on their operation and the results of their inspection," Bacharowski said.

Laurent McReynolds, engineer in charge of the DWP's water operating division, said he is puzzled that the water board has focused on the site. "I think we've got a zealous young inspector who's looking at a bas automotive operation that you find in thousands locations throughout the city," he said.

Bacharowski said the DWP has not been singled out unfairly, adding that inspectors were surprised by conditions at the maintenance yard, which has operated more than 35 years. "There were a lot of questionable activities," including numerous potential pollution sources at the yard, he said.

DWP Criticized

Bacharowski said conditions at the yard seemed inconsistent with the DWP's role as a water provider.

A vast area of the Valley, stretching from North Hollywood east into the Verdugo Mountains, has been designated for Superfund cleanup because of pollution of public drinking-water wells by low levels of chemical solvents.

The main pollutants are trichloroethylene and perchloroethylene—known as TCE and PCE—solvents used in metal degreasing and dry cleaning that are believed to pose a small risk of cancer if consumed at low levels over many years.

Wells tainted by these chemicals belong to the cities of Burbank, Glendale and the Crescenta Valley County Water District, along with the DWP, which draws about 15% of the city's water supply from its wells in North Hollywood and along the Los Angeles River.

The DWP blends its well water with Owens Valley water and serves it to customers in east and central Los Angeles and other areas south of the Santa Monica Mountains.

The DWP has been designated the lead agency for part of the Superfund project, which may cost mc than $100 million. The DWP's role is to pinpoint ti. location and movement of pockets of highly contaminated water so that cleanup measures can be designed.

Aeration Under Way

The DWP also was lead agency for development of a pilot ground water treatment system that began operating in North Hollywood in March. Built with $2 million in Superfund money, the aeration treatment system is extracting some of the most polluted ground water and cleaning it to meet drinking water standards.

Ground water under the maintenance yard flows in a southeasterly direction toward some of the most contaminated North Hollywood wells.

Since ground water is at least 200 feet below the surface in the North Hollywood area, even heavy soil contamination may not reach it for years. Bacharowski said the DWP site is one of about 30 being checked in the North Hollywood area. But it is a high priority for investigation because of conditions observed during the inspections last fall.

In a letter last October to the DWP, water quality officials said that in several areas where chemicals and waste were stored in drums "there was evidence of chemical spills to the ground surface. . . . Stained and distressed asphalt surfaces were observed. Effective control measures were not in place to contain any spilled material . . . or to prevent infiltration of these wastes into the subsurface."

Use of Pit Stopped

Inspectors also saw a 25-foot-deep seepage pit that DWP workers said had been used to drain water used to wash equipment. Inspectors said they were told use of the pit was abandoned "at an unspecified time" in the past.

But the letter said the yard, at the time of the inspections, was discharging waste water into an unlined ditch without a waste discharge permit required by state law.

A work plan submitted May 1 by a DWP consultant outlines several tasks, including testing soil samples near the seepage pit and other suspect areas, researching past waste disposal practices, and recommending improvements in handling of chemicals and fuels. The work plan is under review by Water Quality Control Board staff.

The work plan includes data from an area of the yard where pipes are coated with an asphalt-like material. Samples of surface soil there contained high concentrations of petroleum materials of up to 27,050 parts per million.

But, McReynolds said, he believes that the mainte-

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DWP

Continued from Page 8

nance yard mainly has handled fuels and hydrocarbon-based solvents, as opposed to the chlorinated solvents, TCE and PCE, that have fouled drinking water wells.

"We don't see any operations that would indicate that we used a significant amount of solvent and had any improper disposal of it," McReynolds said.

But he admitted that DWP records do not go back to the 1950s, when the maintenance yard opened.

Under the Superfund program, the EPA can advance funds for investigation and cleanup of toxic pollution, but must try to recover the money from responsible parties, through legal action if necessary. In Burbank, where the agency is proposing a $70-million aeration treatment complex to clean highly polluted ground water, the EPA has served notice on 27 businesses that they may be required to finance the cleanup.

With literally hundreds of aerospace, auto repair and dry cleaning companies having used PCE and TCE over the years—sometimes long before implementation of environmental controls—the pollution in North Hollywood, Burbank and the other areas probably had many contributors.

Although the DWP is a public agency, it could be required to help pay for cleanup if found partly responsible, said Paula Bisson, a section chief with the EPA.

ARROWHEAD: Water Pollution

Continued from Page 3

pumps, which may take years, or trucked away to a toxic dump, which in similar situations has cost about $100,000. In addition, homeowners have been forced to import water at several times the normal price from wells.

Emotional losses have mounted as well, residents agree. A feeling of security has been lost. And anger has built as residents have tried to find out why their wells were still in service two months after they say they first complained of foul tastes and odors.

"I'd personally like to sue somebody, but I think I'd end up suing myself," said Reich, who as a property owner is a shareholder in the water company.

Water company officials say perhaps 500 gallons of gas were lost from a 550-gallon tank after it was pressure-tested for leaks March 4. They now suspect that the inconclusive tests only widened existing holes.

The wells were finally closed April 25, after concentrations of highly toxic benzene, a human carcinogen, were detected at one well at 70 times the state safety level—49 parts per billion, contrasted with a safety level of 0.7 ppb. The highest reading in a home was at the Fishes', where the water had 8 ppb of benzene.

Other than rashes, the only ailments reported by the villas' residents were headaches.

But that doesn't keep community residents from worrying, or from seeking more complete explanations about why two old tanks were installed, apparently after long use elsewhere, next to their wells.

Gene Chiandusse, water company general manager from March until he resigned July 1, said his predecessor did not even tell him that one of the tanks existed.

"This was a one-man operation. Records were kept in his head," Chiandusse said of a longtime former general manager who retired to Arizona in late April and could not be reached for comment.

Most nagging, however, are questions about why the county and state health departments and the water company failed to detect the leaking tanks and were slow to close the wells.

Answers provided so far should shake the residents' trust in those agencies, said veteran Lake Arrowhead water engineer Ralph Wagner, a member of the state's Regional Water Quality Control Board that oversees the eastern slope of the San Bernardino Mountains.

"People have no other place to put faith and confidence than in government agencies, particularly when it comes to health," Wagner said. "And sometimes it's just misplaced confidence."

Acting on a resident's complaint last summer, Wagner investigated the oily sheen on Flemming Creek behind the Arrowhead Villas water company headquarters.

Checking Wagner's complaint, a San Bernardino County investigator reported last August that she looked over a fence from the water company yard at the creek, rather than sampling its soil or water.

Seven months passed before, in late February, Wagner was summoned to the Fishes' home, where he detected "a slight petroleum odor" in the water. Wagner told Chiandusse that standard tests for taste and odor are not designed to detect petroleum and that other methods should be used.

Chiandusse, a product-distribution manager by profession, followed up with tests that indicated gasoline was in the water. A snowstorm kept him from digging up the gasoline tank on April 15, he said.

Chiandusse said he logged the first of 16 resident complaints on March 12 but remembers none specifically about fuel odors. "I went to the residences and drank the water and smelled the water, and I couldn't pick up on anything," he said.

Residents first complained to the state health department March 23, investigators said. Samples taken April 1 were invalid because they were not tested within 24 hours. Also, no test for petroleum was conducted because residents had not mentioned gasoline odors, health officials said.

New samples were taken April 6, but results confirming benzene contamination were not returned until April 19. The wells were closed six days later after an investigator detected the strong smell of gasoline at a wellhead.

Until that day, said health department supervisor Diana Barich, inspectors had not been told that fuel tanks were buried near the wells. Chiandusse said he had assumed the inspectors knew about the gasoline tank. He did not know about the diesel tank until it was dug up later, he said.

Several residents say they are now trying to calmly work out a solution to their water problem. But Traband says "there is still great anger" in the community. And many families continue to drink bottled water.

River pollution hits record, threatening OC's water

FrontPage
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By Marla Cone
The Register

Contamination of the Santa Ana River has reached a record high this year, jeopardizing Orange County's drinking water and putting more pressure on upstream polluters in a longstanding, tri-county battle over the river.

For the third straight year, nitrogen in the river as it flows into Orange County has violated the state's health limit, according to annual tests conducted by the Santa Ana Regional Water Quality Control Board.

Nitrogen, found in human and animal waste, can cause serious blood disorders in infants and pregnant women if ingested in water.

The new findings are more evidence that the river, which supplies two-thirds of the water consumed by north Orange County's 1.4 million residents, is becoming overloaded with pollutants from sewage-treatment plants upstream.

About 100 million gallons of disinfected human waste are discharged into the river each day by San Bernardino and Riverside counties.

The buildup of pollution flowing into Orange County poses a serious risk to the future of the county's water supply because the river directly feeds the county's aquifers, which are tapped by about 500 wells. Some of the wells already are approaching unsafe amounts

Please see NITROGEN/12

Officials upstream say that their residents must pay the cost, while Orange County gets the benefit of a clean, inexpensive water supply

f nitrogen, and if they violate the tate limit, they must be shut down ihd the water replaced with arce, costly imported supplies.

A report on the river sampling, onducted in late summer, will be resented today to the water oard, the regional arm of state overnment responsible for protecting the area's waterways.

"It is the highest average we ave recorded," said Gerard Thibault, the water board's executive officer. "The nitrogen is slowy increasing with time. It's higher very year."

Two other pollutants in the river lso violated the state's limits nown as BOD and COD, the conaminants indicate an excessive mount of impure discharge. In ddition, a buildup of sodium approaching the state's limit also as detected.

Next spring, the board is expectd to vote on costly rules that ould force 20 publicly owned sewge treatment plants in San Berardino and Riverside counties to lean up their discharges.

The nitrogen-filtration equipsent could cost several hundred illion dollars, a cost that eventully would be passed on to developrs building new homes or residents paying sewer bills in the two ounties.

"In the long run, the money omes from ratepayers. ... It's really expensive," said Joseph Grindstaff, waste-water systems manager for the city of Riverside. "People just don't realize how much money is needed for waste-water treatment."

The deterioration of the Santa Ana River comes as no surprise to Orange County water officials. For the past several years, they have warned about the nitrogen buildup and asked the regional board to crack down on pollutants flowing from the two upstream counties.

"It's of high concern for us," said Nick Richardson, assistant manager of the Orange County Water District. "We've been objecting to it for several years now. We could see it coming."

Nitrogen from the waste water poses the most serious threat to the large, valuable aquifers that underly north and central Orange County, Richardson said.

The limit for nitrogen is 10 milligrams per liter. The 1988 samples, collected at Prado Dam, just outside the Orange County border, contained an average of 10.3 milligrams. In 1987 and 1986, the averages were 10.2, up from 9.8 in 1985 and 7.3 in 1984, the year testing began.

Health experts say thatmore than 10 milligrams in a liter of drinking water poses a risk of fatal blue-baby disease in infants.

Please see NITROGEN/13

12/9/88 Orange County Regist

Already, at least 30 wells in Orange County have been shut down or abandoned because they exceed nitrogen limits. About 250,000 acre-feet of the county's ground water — enough to serve more than 1 million people for a year — is too contaminated to drink.

"Nitrogen is a ubiquitous pollutant," Richardson said. "It comes from landscape irrigation and septic tanks. We pollute our own ground-water basin with it, so we don't want the water coming down the river to be right at the limit."

The ground-water basin is considered one of the county's most valuable resources because it provides the cheapest water in Southern California. Pumping water from the ground costs only about half as much as importing it from the Colorado River or Northern California.

San Bernardino and Riverside counties are resisting the pollution controls because they could increase sewer-connection fees significantly. The connection fee for a new home in Riverside is now $7,000.

The total cost has not been determined, but the cities of San Bernardino and Riverside estimate that their nitrogen-treatment systems could cost $8 million apiece. The two cities' plants contribute about 60 percent of the effluent dumped into the river, or about 60 million gallons a day.

Because of the opposition, the water board decided earlier this year to delay a decision on nitrogen controls until a $1 million study is complete next spring. The study will recommend how to divide the burden among the 20 plants.

Thibeault said the waste-water plants already have been put on notice that they will be required to reduce nitrogen to protect Orange County's water.

In anticipation, some municipal and regional plants in the two counties already have begun designing new treatment systems. The city of Riverside expects its first phase to be in operation within 1½ years, Grindstaff said.

"We've been changing our process," he said. "We hope we can get our effluent down to under 10 (the nitrogen limit)."

The technology for removing nitrogen is well-perfected. But the two counties also face orders to initiate tertiary treatment on waste — the most effective form of killing bacteria — and a combination of the two systems is unprecedented.

"It's never been tried anywhere in the country," Grindstaff said. "Nobody's had to meet the combination of standards that the regional board is putting on us. We think we can do it, but it will need careful control."

Officials upstream say that their residents must pay the cost, while Orange County gets the benefit of a clean, inexpensive water supply.

The Orange County Water District, however, already is taking expensive steps to remove nitrogen from its ground water. A $1.3 million, first-of-its-kind plant is nearing completion in Tustin to purify water from one polluted well.

The pollution is expected to worsen unless controls are required. Because of rapid growth in the two inland counties, sewage effluent discharged into the river is increasing at a rate of about 10 percent a year, Thibeault said.

Except after storms, 80 percent to 90 percent of the river's flow is treated sewage.

"I expect the nitrogen will slowly inch up," Richardson said. "The sewage discharge gets higher and higher, but the assimilation capacity of the river stays the same."

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APPENDIX B

THE HEALTH EFFECTS OF GROUNDWATER POLLUTION

By
Erik D. Olson, Counsel
and
Gerald V. Poje, Ph.D., Environmental Toxicologist,
National Wildlife Federation

Serious groundwater contamination occurs in every state in the nation, including contamination above safe health levels in many states by synthetic organic chemicals, nitrates, bacteria, viruses, pathogens and many other organic and inorganic contaminants.

The overall impacts of groundwater pollution upon public health are difficult to establish with precision. As noted in our testimony, while EPA has documented that 52,000 people became acutely ill from drinking contaminated groundwater from 1981-1985,[1] the Agency admits that this number probably underestimates substantially the actual magnitude of acute illnesses.

Chronic diseases, such as cancer, often are very difficult to link to consumption of environmental contaminants.

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1. U.S. EPA, Proposed National Primary Drinking Water Regulations; Total Coliforms. 52 Fed. Reg. 42,226 (Nov. 3, 1987).

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Preliminary epidemiological studies are just beginning at several sites across the country to determine the full magnitude of the health effects of the dumping of cancer-causing agents and other toxic chemicals with chronic effects into our underground water supplies. Two of the most recent studies on these health effects are noted in the main testimony.

Cancer and birth-defect-causing chemicals, and even "immunosuppressive" chemicals that weaken the body's defenses against attack by pathogenic bacteria, viruses and parasites, have been found in the groundwater in virtually every state in which the groundwater has been tested intensively. These organic and inorganic chemicals can come from numerous unregulated or under-regulated sources of groundwater pollution ranging from unlined industrial pits to leaking storage tanks.

In addition, studies of the potential health effects of agriculturally-related groundwater contamination are just beginning to be completed. Agricultural chemicals have been implicated in acute and chronic diseases and in the specific impairment of major organ systems.[2] Drinking water from wells with elevated nitrate concentrations has resulted in

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2. S. Murphy, "Pesticides," in Casarett and Doull's Toxicology the Basic Science of Poisons (Macmillan Publishing Co., 1980).

methemoglobinemia, a biochemical impairment of the blood's ability to carry oxygen.[3] Nitrites may serve as essential precursor molecules for the formation of nitrosamines, some of which are potent carcinogens. The epidemiological implications of drinking water contamination with nitrates and nitrites have not been fully evaluated. However, some investigators have expressed concern over increased occurrence of stomach cancer[4] and congenital malformations[5] associated with consumption of nitrate and nitrite contaminated drinking water. Exposures to pesticides have been implicated in chronic illness such as

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3. Infants are particularly susceptible to nitrate poisoning because they have proportionally higher intakes of fluids, their acidic gastrointestinal tracts provide an environment for production of the ultimate toxicant, and their fetal hemoglobin is more sensitive than adult hemoglobin. Busch and Meyer documented a recent case in South Dakota where a six-week-old infant recovered from methemoglobinemia-induced cyanosis (J. Environm. Health, 1982. 44(6):310-311). The Des Moines Register (July 29, 1986, p.1) reported a mortality attributed to nitrate poisoning.

4. O.M. Jensen, "Nitrate in drinking water and cancer in northern Jutland, Denmark, with special reference to stomach cancer," Ecotoxicol Environ Safety 6: 97-101 (1982).

5. M. Dorsch, R. Scragg, A. McMichael, P. Baghurst and K. Dyer, "Congenital malformations and maternal drinking water supply in rural South Australia: a case-control study," American Journal of Epidemiology (1984).

Parkinson's disease[6] and cancer[7] as well.

Establishing conclusively that chronic human illness is caused by chronic low level exposure to chemicals found in groundwater is extremely complex. Several complicating factors may lead decision-makers to understate substantially the public health significance of current low level contamination with nitrogen fertilizers, pesticides and other contaminants.

For many carcinogens the time between first exposure and onset of the tumor is usually no less than 15 years and can be as long as several decades. Similar patterns of long latency may occur with other chronic diseases. Given the increasing use of synthetic organic chemicals within the past two decades, present patterns of illness in agricultural and industrial areas may not accurately reflect future patterns of illness.

Second, epidemiological studies are generally insensitive. Our ability to detect relatively rare diseases such as many forms

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6. R. Lewin, "Parkinson's Disease: an environmental cause?," Science 229: 257-258 (1985).

7. See, for example: S. Hoar, A. Blair, F. Holmes, C. Boysen, R. Robel, R. Hoover and J. Fraumeni, "Agricultural herbicide use and the risk of lymphoma and soft-tissue sarcoma," Journal of American Medical Association 256(9): 1141-1147 (1986). Also, L. Burmeister, G. Everett, S. Van Lier and P. Isacson, "Selected cancer mortality and farm practice in Iowa," American Journal of Epidemiology 118(1): 72-77 (1983).

of cancer (e.g., leukemias, liver tumors, soft-tissue sarcomas), depend upon surveying large numbers of people. When epidemiologists aggregate highly vulnerable people and very slightly vulnerable people into a single, large exposure group, the results tend to show a lower average occurrence of disease than is experienced by the most highly susceptible individuals. Toxicological testing shows that susceptibility to a particular chemical varies: between infants and adults; between men and women; between pregnant and non-pregnant women of child-bearing age; among people of different genetic backgrounds; and between healthy and unhealthy people.

Third, because of inadequate toxicological testing, we simply do not know the full range of adverse health effects caused by many chemicals, including both the active and so-called "inert"[8] pesticide ingredients. For example, some pesticides are known to cause neurological damage, but EPA has not established a protocol

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8. As of April 21, 1987 EPA divided the approximately 1200 "inert" ingredients into four categories: 1. Inerts of Toxicological Concern: 50 chemicals known to be toxic; 2. Potentially Toxic Inerts/ High Priority: 60 inert ingredients which are structurally similar to known toxicants; 3. Inerts of Unknown Toxicity: Approximately 800 ingredients of which EPA has inadequate information to determine toxicity; 4. Inerts of Minimal Concern: 300 inert ingredients that are generally recognized as safe. The lack of available health and safety information betrays our greater inability to assess the toxic hazards of many pesticide formulations.

for testing all pesticides for these effects. For most pesticide ingredients EPA will not require tests to identify which cause birth defects unless it believes that a large number of women will be exposed. Cancer testing is incomplete for the majority of synthetic organic chemicals, including most pesticides. Furthermore, for the most part, toxicological tests have focused upon single chemicals, and therefore little data is available for assessing the health and safety of chemical mixtures such as pesticide formulations.

Fourth, laboratory toxicological data suggesting that exposure to a low level of a chemical is "safe" may be misleading. In the real world people are exposed to several chemicals at once. Increased risks may occur through either simultaneous or sequential exposure to several chemicals. Some interactions may be antagonistic: simultaneous exposure to two chemicals results in lower damage than would be caused by either chemical if administered alone. Other interactions may be synergistic: simultaneous exposure to two chemicals result in greater damage than would be caused by either chemical if administered alone. For the vast majority of chemical combinations, there are <u>no data</u> to describe their interactions.

Fifth, current monitoring captures only a small sample of potential contaminants[9] and present exposure levels may not reflect the past history of exposure. Public water suppliers are not required under EPA's implementation of the Safe Drinking Water Act to monitor for the most widely used organic chemicals. In general, the government does not assess private water well quality. "Inert" ingredients in pesticide formulations are generally claimed as trade secrets, and therefore these chemicals are not sought during monitoring efforts.

In summary, no comfort should be taken from partial monitoring studies which indicate "only low levels" of contamination. Today's exposures may lead to diseases many years from now. Current epidemiological evidence cannot assure the health safety of these levels. Toxicological data are woefully inadequate to pro-

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9. In August, 1987 EPA issued draft health advisories for 50 common pesticides with a high potential for contaminating drinking water. Only 15 (30%) advisories indicated that standard analytical methods and detection limits for the pesticide in water were available. For 7 (14%) pesticide health advisories, no analytical method was available.

Only during the past year has EPA developed methods to detect a significant number of pesticide active ingredients and break-down products. According to EPA's Project Summary, this past year's National Pesticides in Groundwater Survey pilot tested five new multi-residue methods, which along with two older methods will analyze for the presence of about 120 pesticides (70 "priority pesticides and 50 "non-priority" pesticide chemicals).

vide assurances of safety for any single chemical. Real world exposures will include simultaneous and sequential exposures to a barrage of chemicals. Finally, present methods for measuring agricultural chemicals open only a tiny window to view the world of chemical contamination in the environment.

Thus, while we know that each year thousands of Americans become acutely ill from drinking contaminated groundwater, the true magnitude of the effects of groundwater on public health has yet to be fully revealed. What we know may be the tip of the iceberg.

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APPENDIX C

GAPS IN CURRENT FEDERAL PROGRAMS FOR GROUNDWATER PROTECTION

A. EPA Activities

The federal government currently is engaged in a variety of groundwater related research, regulatory, and other activities. Most of our effort and dollars at the federal level have gone into cleaning up contamination after the fact. We spend billions of dollars under Superfund and the corrective action provisions of the Resource Conservation and Recovery Act (RCRA) cleaning up old leaking hazardous waste dumps and certain underground storage tanks. Of course these cleanups are critically needed, but what are we doing to prevent contamination today and in the future from the abundant sources of groundwater contamination?

An EPA report[1] and past Agency testimony on groundwater legislation[2] before a subcommittee of House Public Works and Transportation Committee, state that at EPA alone there are 270 separate ongoing groundwater related activities. This existing patchwork of often uncoordinated, poorly managed, and grossly under-funded federal programs, ranges from site-specific

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1. EPA Office of Groundwater Protection, "EPA Activities Related to Sources of Ground-Water Contamination," (February 1987).

2. Statement of Donald J. Ehreth, Deputy Assistant Administrator for Research & Development, EPA, to the Subcommittee on Water Resources, of the House Public Works and Transportation Committee, July 8, 1987, page 6.

technical assistance, to the complex regulatory and permitting schemes for hazardous waste dumps. These programs are not protecting the public's health or the environment adequately; they have many gaping holes, and often have been extraordinarily ineffective at dealing with the groundwater protection problem.

For example, while EPA does actively regulate hazardous waste dumps, the Office of Technology Assessment has identified at least 32 other important sources of groundwater contamination, most of which EPA regulates either minimally or leaves completely unregulated. By EPA's calculation, it has "some level of activity" for 25 of these categories of sources, and no activity for at least eight categories of sources, according to a report by EPA's Office of Groundwater Protection.[3] However, a careful review of the 25 categories of sources purportedly dealt with by EPA, reveals that EPA and state regulations for many sources are virtually nonexistent.

The EPA Groundwater Office's report states, for example, that there is a "high level" of regulatory activity for landfills, land application of waste, surface impoundments, and waste piles.[4] A study by a different EPA office--the Solid Waste and Emergency Response Office--that was mandated by the Hazardous

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3. Id. at 6.

4. Id., Exhibit III-2.

and Solid Waste Amendments of 1984[5], however, paints a completely different picture.[6] This Solid Waste Office study found that the regulation (if any) of these sources was at best ineffective. Approximately 90 percent of the 16,416 active landfills have no liners to protect the groundwater, and 96 percent have no system to collect the leachate that seeps from the landfill. More than eight out of ten landfills fail even to monitor groundwater, and 60 percent place no restrictions on the waste accepted. More surprisingly, almost 5,000 landfills are not inspected even once a year. Because of loopholes in existing laws, thousands of tons of hazardous waste are disposed of in these landfills.[7]

Another source for which the Groundwater Office at EPA claims there is a "high level" of regulatory activity is surface impoundments. The EPA Solid Waste Office study, however, finds that there are over 190,000 surface impoundments, including 17,000 agricultural waste surface impoundments ("known to have

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5. These 1984 amendments overhauled the Resource Conservation and Recovery Act (RCRA). Following the completion of the second phase of this study, EPA is to recommend to Congress changes for facilities receiving waste not classified as "hazardous" under EPA rules; EPA also is required to revise its "criteria" for municipal dumps and other facilities receiving household hazardous waste, and hazardous waste from small-quantity generators. See RCRA §4010.

6. EPA Office of Solid Waste and Emergency Response, "Subtitle D Study: Phase 1 Report." (October, 1986).

7. Id. at ES-8 to ES-11.

high concentrations of nitrates, pesticides, herbicides, and fertilizers"), over 125,000 oil and gas waste impoundments (containing "high concentrations of chloride, total dissolved solids, barium, sodium, and calcium"), over 16,000 industrial surface impoundments, and over 24,000 mining waste surface impoundments. Of these, 71 percent are unlined, and only one percent use a plastic or other synthetic (non-soil) liner. Ninety-nine percent of these impoundments have no leak detection systems, 96 percent have no groundwater monitoring programs, and 73 percent have no restrictions on the waste placed in the impoundment. Sixty percent of the impoundments are not even inspected annually.[8]

The record for protection of the groundwater is no better, and indeed often is worse, for other sources of contamination. Thus, it is clear that the regulatory mechanisms are inadequate to protect human health and the environment.

B. USGS Activities

The U.S. Geological Survey (USGS) has numerous authorities, albeit general and vague ones, to conduct research on groundwater quality and quantity. The Survey is not, however, an agency with the experience or expertise to regulate. The USGS has conducted

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8. Id. at ES-12 to ES-14.

numerous useful studies, summarized periodically in the "National Water Summary" series, of the problems facing groundwater. However, the Survey often is extraordinarily careful to maintain an academic disinclination to involve itself in policy and regulatory disputes.

C. Conclusions About EPA and USGS Activities.

The enormous gaps in current federal laws demonstrates that now is the time for Congress to adopt comprehensive federal groundwater legislation. Thus, while the National Wildlife Federation supports the improvement of the research activities at USGS and EPA, we urge the subcommittee to recognize that research and coordination are only a small part of the solution. Only comprehensive groundwater quality protection legislation will assure that groundwater resources that are safe to drink are available for current and future generations of U.S. citizens.

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APPENDIX D

THE ELEMENTS OF COMPREHENSIVE
GROUNDWATER POLLUTION PROTECTION LEGISLATION.

Comprehensive groundwater pollution protection legislation should have as its goal the prevention of pollution of all the nation's groundwater so that today's generation will bear the costs of its own economic and social activities. The law should assure that all current and future Americans will have safe water to drink and that the biological, chemical and physical integrity of the nation's groundwater resources will be protected.

To achieve these goals the law should require national technology or methodological standards for groundwater pollution sources, requiring that those responsible for each source must do the best that can be done to avoid pollution. For some large sources of pollution, such as industrial landfills and impoundments, permits imposing these source controls should be required. For other more numerous and individually difficult to regulate sources, such as septic tanks, states should be given sufficient flexibility to come up with effective control methods. The law also should take us beyond the "end of the pipe" pollution control method and should establish numerical goals for reducing the amount of waste generated.

Federal groundwater legislation should establish national minimum groundwater quality standards, based on human health and

ecological impacts, that would serve as a "backstop" to assure that pollution source controls are working; these standards, however, should not become "pollution licenses" up to which the avoidable groundwater pollution may be allowed.

The federal government, through the EPA, must also take an active role in approval and oversight of state programs and the federal government must be obligated to implement or enforce federal groundwater protection programs in the event that states fail or choose not to do so.

Groundwater classification would be utilized to provide for an additional level of protection for particularly vulnerable or particularly crucial groundwater resources. In no case should classification be used to lessen the stringency of established technological standards. We cannot know today the needs of generations hence for groundwater that some would have us "sign off" as disposal zones.

Federal groundwater legislation should provide for public access to information and active involvement in the development of state and federal program regulations, permit approvals and enforcement and oversight activities. A federal right of action should be included in the statute.

The legislation should get the federal house in order. It should require a detailed plan for protecting the groundwater

that is critical to maintaining the continued vitality of the one third of the nation's land that is in the federal domain. The legislation also should direct that the government's many groundwater protection activities be better coordinated through an inter-agency committee but should not give the Office of Management and Budget more authority in doing so.

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Environmental Policy Institute
OCEANIC SOCIETY

Testimony of

Velma M. Smith

for the
Environmental Policy Institute/
Friends of the Earth

before the

House Committee on Small Business
Subcommittee on Environment and Labor

November 14, 1989

Mr. Chairman, members of the Subcommittee, my name is Velma Smith, Director of the Groundwater Protection Project for the recently merged Friends of the Earth and Environmental Policy Institute. On behalf of EPI and FOE, I thank you for this opportunity to testify and commend you for your strong interest in addressing the nation's growing problems with groundwater contamination.

The Importance of the Resource

As you know, groundwater is a vast and important national resource. In volume, our groundwater resources are over 20 times greater than all of the freshwater in our rivers, lakes and streams,[1] and the availability of clean water from underground sources affects virtually all Americans.

Nearly 117 million citizens rely on groundwater for drinking water; included in that number are 97 percent of rural households and more than one-third of the 100 largest U.S. cities. Forty percent of agriculture's irrigation needs are met by groundwater, and more than one-fourth of industrial water used in the U.S. comes from underground water sources.[2]

Furthermore, groundwater is intimately connected with surface water, and the quality of our rivers and streams is

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1 See, for example, Eckardt C. Beck, "Ground Zero for Groundwater," in Groundwater Protection, Environmental Protection Agency, Water Planning Division, November 1980.

2 For groundwater withdrawal statistics, see, for example, Larry M. Canter, Robert C. Knox and Deborah M. Fairchild, Ground Water Quality Protection, Lewis Publishers, 1987.

218 D Street, SE
Washington, DC 20003
202-544-2600
202-543-4710 (fax)
650-192-5483 (telex)
foedc (EcoNet ID)

linked to the quality of water flowing through aquifers which may or may not currently be tapped by wells. For example, some estimates indicate that a billion gallons of groundwater per day seeps into the Atlantic and Pacific Oceans and an average of 30 percent of the flows of surface streams comes from groundwater.[3] Thus, polluted groundwater affects not only human beings who may drink that groundwater but also fish, wildlife and surface-water users.

Yet, despite the importance of the groundwater resource to both human health and environmental quality, its need for protection seems to have been overlooked for many generations, and today we are faced with a growing recognition that America's groundwater is in serious jeopardy.

Extent of Contamination

Groundwater contamination is no longer discussed as a remote possibility affecting only a few communities. Groundwater problems have been reported in every state of the nation. Literally thousands of wells have been closed, and nearly 80% of the sites identified on the Superfund National Priority List manifest problems with groundwater contamination.[4]

We do not have today nor will we ever have a complete picture of groundwater quality throughout the nation, but much of the data we do have is troubling indeed.

> The U.S. Geological Survey, after testing more than 120,000 wells across the country, found nitrate contamination in 48 states, with contamination levels in some states exceeding health standards in over 20 percent of the wells tested.[5]
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> Data from EPA's Groundwater Supply Survey, released in 1983, showed the presence of one or more industrial solvents in 28% of the randomly selected groundwater supplies serving populations of more than 10,000 persons.[6]
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> In Iowa, State officials have cautioned that as many

3 U.S. Water Resources Council, The Nation's Water Resources 1975-2000, 1978.
4 Office of Solid Waste and Emergency Response, U.S. EPA, Extent of the Hazardous Release Problem and Future Funding Needs, CERCLA Section 301(a)(1)(c) Study, Final Report, 1984.
5 Madison, R.J. and J.O. Brunett, "Overview of the Occurrence of Nitrate in Ground Water of the United States," in USGS, National Water Summary 1984, Water Supply Paper 2275, 1985.
6 Westrick, James J., J. Wayne Mello and Robert F. Thomas, The Ground Water Supply Survey Summary of Volatile Organic Contaminant Occurrence Data, U.S. EPA, January 1983.

> as half of the State's 800 public water supplies may be contaminated with pesticides and other organic contaminants, and a monitoring program in the State of Texas revealed pesticide contamination of water wells at 42 cropduster sites in the state.[7]
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> A 1987 survey of private and public water wells in Minnesota found pesticides in 37 percent of the samples tested. Of the 225 private wells tested, more than 50 percent contained at least one pesticide.[8]

And lest we forget -- as we tend to do -- that groundwater and surface water are connected, let me mention a few other problem examples.

> In 1985 the completion of a gas production well in Virginia had an unexpected effect. Grout pumped into the newly drilled well traveled through the groundwater to a spring which feeds a State-owned fish hatchery. Thousands of trout were lost and thousands more had to be transported to a clean water source.[9]
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> At one Superfund site in Maine, chemicals such as TCE, toluene and methylethylketone seep from the groundwater, along the shore and into the Annabessacook Lake. The source of the problem -- landfilled industrial waste located about a quarter of a mile from the Lake.[10]

Perhaps we face these unsettling statistics and anecdotes today because we entered the chemical age -- and clearly enjoyed its benefits -- with a mistaken notion that groundwater is immune from contamination. And now we find that we've manufactured and used a host of substances, from degreasers to dioxin, with little regard for their potential to pollute groundwater. Historically, we haven't worried too much about landfilling our garbage, pouring or even pumping toxic chemicals into the ground, reapplying chemical fertilizers and pesticides on farm fields year after year, or storing wastes in slowly leaking ponds.

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7 Charles Bullard in The Des Moines Register, "Half of cities's water tainted by pesticides: Study expresses concern for long-term effects," March 19, 1986 and Rick Piltz, in Grassroots, "Once the Well is Poisoned, It's Too Late," Texas Department of Agriculture, fall 1987.

8 Environmental Protection Agency, Office of Pesticides and Toxic Substances, Agricultural Chemicals in Ground Water: Proposed Pesticide Strategy, December 1987.

9 Virginia Water Control Board Memoranda, November 8, 1985 and May 21, 1986; news clippings, Roanoke Times and World News, October 9, 10, 11 and 18, 1985.

10 Personal communication, Sandra Marquardt of the Environmental Policy Institute with Patricia Meaney, U.S. EPA, Region I.

Now it becomes clearer everyday that groundwater is not uniquely protected from contamination. In fact, groundwater is vulnerable to contamination from a wide variety of activities that occur in every community across the nation.

Sources of Contamination

The diversity of groundwater contamination sources runs the gamut from the homeowner's malfunctioning septic tank to the byproducts of the nation's defense system. Oil-drilling, road-deicing, farming, mining, chemical storage and just "throwing away" our household trash may affect and degrade groundwater resources. The Office of Technology Assessment compiles a large list of groundwater contamination sources,[11] and the National Research Council warns that "virtually all human activity" may affect groundwater.[12]

Along with the diversity of causes, we also find a diversity of existing Federal and state authorities to prevent, detect and correct groundwater contamination. At least eight major Federal laws speak to the issue of groundwater to some extent, and within each state it is possible to find as many as seven agencies dealing with groundwater issues. In 26 states or territories numeric water quality standards can be applied to groundwater; 15 states or territories use narrative standards; and 23 utilize both narrative and numeric groundwater quality standards. The same General Accounting Office report that provides us with those statistics also indicates that at least 22 states have written groundwater plans or strategies.[13]

But while the states write "strategies" and the lawbooks provide us with a great many pages of text devoted to groundwater, there are hundreds of communities across this country with citizens who will attest to the failure of those laws, the associated regulations and enforcement mechanisms that are supposed to give their groundwater adequate protection.

The Need for Action -- on Research and Regulation

Perhaps Members of this Committee have heard from a community where a public water supply has been contaminated and the town or the county is seeking a new treatment system or water source. Certainly, as we have heard this morning, the Chairman

11 Office of Technology Assessment, Protecting the Nation's Groundwater from Contamination, 1984.
12 National Research Council, Committee on Ground Water Quality Protection, Water Science and Technology Board, Ground Water Quality Protection: State and Local Strategies, 1986.
13 General Accounting Office, Groundwater Protection: The Use of Drinking Water Standards by the States, GAO/PEMD-89-1, December 1988.

of this Subcommittee has had to grapple directly with trying to help citizens with contaminated water supplies.

For those people who have called your offices and ours and for the people who depend upon you and our system of government to protect their interests, we are urging Members of Congress to act with haste and determination to protect groundwater with new Federal legislation.

To draw a phrase from the report of the National Groundwater Policy Forum, what we need is "Action Now." Please keep in mind that that report calling for action was released some time ago, and that EPA Administrator William Reilly -- then President of the Conservation Foundation -- was among those who agreed that action was needed.[14]

What sort of action is appropriate now? Should we initiate new research efforts? Can we afford to continue simply responding to cleanup demands while we evaluate options? Or do we have sufficient information to allow us to set up new regulatory programs? Although Congress seems to be focused almost exclusively on the former -- that is, solely research -- we believe that it is well past time to make new inroads in the area of groundwater regulation.

As the the Office of Technology Assessment has cautioned: "A complete description of groundwater quality may never, for all practical purposes, be attainable."[15] We can, however, act to narrow the range of scientific uncertainty that surrounds the issues of groundwater pollution. There is much we have yet to learn and much more we have to master when it comes to groundwater and groundwater protection. Research into a variety of technical areas would prove useful, and demonstration programs are sorely needed to transfer current state-of-the-art knowledge from "experts" to local, state and even Federal decision-makers.

But there is also much that we do know today. We know that groundwater is vulnerable to contamination from a variety of sources, and with many of those sources of contamination, we know of prudent measures that will help to protect groundwater. We must not delay in assuring that those protections are implemented across the nation.

A major research initiative was not necessary a few years back to ascertain that leaking underground storage tanks were a signficant threat to groundwater or to determine that a ban on bare steel tanks for holding petroleum products underground was a sensible and doable idea.

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14 National Groundwater Policy Forum, Groundwater: Saving the Unseen Resource, 1985.

15 Office of Technology Assessment, Protecting the Nation's Groundwater from Contamination.

Today, while there is much we can learn from groundwater research, we do not need to wait for the results of research to know that storage of liquid fertilizers in unlined pits can and has caused groundwater contamination, that septic systems must be located only in appropriate soils and that they must be pumped out periodically to continue functioning. We don't need research to tell us that chemigation without the protection of backflow prevention devices is not sound practice or that injection of waste materials underground directly through the annulus space of a well is a bad idea with high probability for problems. We don't need research to tell us that application of fertilizers without soil testing may result in overuse of chemicals, that garbage dumps without liners may allow the escape of polluted leachate more rapidly or more extensively than might be expected in lined landfills, that industrial operations which have floor drains connected to shallow discharge wells may be pumping harmful chemical residues directly into drinking water sources.

Thus, we believe that if groundwater research legislation is one part of a national groundwater program -- the part that helps to advance and disseminate groundwater knowledge -- while other program elements serve at the same time to initiate new regulatory programs and enhance and expand current regulatory efforts, then groundwater research is a step in the right direction.

But if groundwater research legislation becomes the rationale for delay, the reason to push groundwater problems to the Congressional back-burner for a few more years, then it is a grave mistake.

Suggestions for National Groundwater Policy

Thus, as this Members of this Committee consider what Congress can do for groundwater in 1990, we urge you not to fall into the trap of thinking solely of research but to think of research priorities as part of an overall program -- including research, education, technical assistance and regulation -- to protect groundwater.

Over the past session of Congress, while Members of Congress were debating groundwater research options, a group of environmental organizations also attempted to think through some options for groundwater protection. These groups, including the Environmental Policy Institute and Friends of the Earth as well as the National Wildlife Federation, Natural Resources Defense Council, Environmental Defense Fund, Clean Water Action Project, U.S. Public Interest Research Group, Izaak Walton League and the National Audubon Society assembled a proposal for Federal leigslation and released that proposal in June of last year.

We released that proposal late in the last session of Congress, not because we presumed that our proposal was immediately ready to be precisely rewritten into statutory language and embraced in full and in detail by the Congress, but because we felt that our proposal offered some new perspectives on how to approach a problem that can appear so daunting and so overwhelming. We offered our proposal in the spirit of fostering detailed discussions of a full range of options for groundwater protection. This morning I would like to briefly outline some of the principles behind that proposal.

We begin with the assumption that Federal legislative action is necessary. But in making that call we do not lose sight of the fact that laws related to groundwater already abound. What we call for is not just another environmental law but a law which corrects the fundamental flaws inherent in our current approach to groundwater problems and one which will be matched with a commitment of political will and resources to fully carry it out. Anything less will be but a hollow promise to water users today and in the future.

First, we must recognize that groundwater will not be protected by programs that merely respond to contamination after the fact. There is widespread agreement and painfully clear evidence that groundwater cleanup is technically difficult and expensive. Yet most of the governmental resources devoted to groundwater remain directed toward cleanup, not prevention. This is true even beyond the multi-billion-dollar Superfund effort, for many of our existing regulatory approaches rely primarily on detection of contamination to trigger control of discharges.

So, borrowing from the Federal Clean Water Act, we call for a national goal to protect and enhance the physical, chemical and biological integrity of the nation's groundwater resources.

Adoption of this goal will not bring an automatic end to all groundwater pollution discharges. Rather, this ambitious goal will guide both Federal and state policy decisions with a determination that no avoidable pollution is "acceptable." It will set the basis for programs to protect the groundwater resource -- not just our predicted "uses" of that resource. It will signal a commitment that should drive our shared resources and ingenuity toward crafting and achieving better means of pollution prevention so that future generations of Americans are not left with a legacy of polluted water.

Second, the ultimate answers to groundwater protection cannot ignore the connections of groundwater to surface water and the interrelationships of other environmental media with groundwater. Therefore, we seek a Federal groundwater program that will stop the national pollution shell game and instead seriously promote waste reduction and improved chemical efficiency. Rather than forcing future generations to forego the

use of water resources, we believe we would do better to forego today the use of some toxics and to eliminate the generation of wastes. The highest and best use of groundwater, afterall, is not as a sink for chemical residues. Nor, we suspect, is the best use of produced chemicals as an additive to groundwater.

We recommend that Congress adopt target numerical goals for waste reduction and we urge the Federal government to provide technical and financial assistance to states for targeted research and demonstration projects on waste reduction, reuse and recycling.

Third, we must not make the mistake of waiting to control groundwater discharges until we develop full and unassailable toxicological profiles for the tens of thousands of chemicals in use. In other words, we cannot let standard-setting set the pace for pollution control. A look at our experience with standard-setting, data-gathering and risk-assessment on a chemical-by-chemical basis with the Safe Drinking Water Act, the Clean Water Act, the Toxic Substances Control Act or the Federal Insecticide, Fungicide and Rodenticide Act indicates that that approach is less than expeditious and fraught with problems and uncertainty.

Numerical water quality standards have a role in resource protection, but they cannot serve us effectively if we use them either as the sole basis for action or as a government-sanctioned license to pollute. The first line of defense in Federal groundwater legislation must be source controls, not water quality standards.

We believe that effective groundwater protection throughout the nation will occur only when the Federal government acts to adopt a national program of source controls to minimize or eliminate discharges of pollutants and toxic chemicals to groundwater. There must be minimum Federal standards of care and control for sources and activities which have the potential to pollute groundwater resources.

The source control approach -- which comes to us in the Clean Water Act in the form of technology-based controls on wastewater discharges established and applied uniformly to various categories of facilities nationwide -- is one which our coalition believes can work for groundwater protection.

It is the most direct approach to pollution abatement. Indeed, it is where any groundwater protection scheme must eventually arrive. It provides for equitable treatment of all polluting sources; it guards against economic blackmail in individual states and communities; and it rewards environmentally sound activities by requiring uniform results across economic sectors.

For certain sources of contamination, we believe that the first and most fundamental level of control should be specified in the Federal legislation, generally for immediate application. "Statutory standards," under our coalition's proposal, would provide for necessary reforms to eliminate clearly unacceptable practices or technologies which threaten groundwater -- much in the way that Congress addressed the significant problems of leaking underground storage tanks by banning outright the installation of bare steel tanks.

Examples of the type of statutory standards that we belive may be appropriatre include:

A requirement for backflow devices on all irrigation wells that may be utilized for direct application of fertilizers and pesticides;

A ban on septic tank or other on-site sewage treatment system cleaners containing toxic synthetic organic chemicals;

A prohibition on road-spreading, deicing or dust abatement with oil brines or other oil production wastes.

Beyond these least technical and least complex statutory standards, we intend for Federal legislation to direct EPA to establish two additional levels of source controls: Best Practicable Methods (BPMs) and Best Available Methods (BAMs). This two-tiered approach promises fairness and equity among the regulated community and provides for a reasonable consideration of economic and technological constraints to pollution prevention.

In developing the BPM regulations -- including technology, design, operation and maintenance and monitoring protocols -- we believe that EPA should be directed to select the best control methods and practices which would be generally available to or attainable by the preponderance of sources within a given category. However, economic impacts should not be considered for individual sources or for any subcategory so situated as to present an inherent threat to groundwater quality, such as placement of waste piles over high water table areas.

On a schedule that would follow that for the BPMs, we believe that EPA should develop a more stringent set of requirements for each groundwater pollution source category -- best available methods. As the name implies, EPA would not, in this round, be selecting controls that were necessarily generally available. Instead and in line with our focus on source reduction and waste elimination, we would require this highest level of source control to be based on consideration of the full range of mitigation, source reduction and recycling techniques

available for a given category of activity.

The states, in our view, should then be empowered to build upon these minimum Federal requirements. They should be provided with sufficient flexibility to authorize alternative but equally effective means of achieving pollution prevention and waste reduction, but they should not be provided with the flexibility to choose not to apply protections toward all or a portion of their groundwater resources. Nor should they be provided with the power to excuse individual sources from the basic requirement to employ all means available to prevent groundwater discharges.

Fourth, effective groundwater protection programs must be comprehensive. The nature of groundwater demands an ambitious program of source controls for implementation by the states. We cannot apply controls only to the easy targets -- the large industrial facilities -- and expect to make the kind of improvements that are necessary. With groundwater, we must address point and nonpoint sources, and we must effect changes in the behavior of "polluters" who have previously escaped or been only lightly touched by environmental regulation.

For our proposal, we have drawn from the Office of Technology Assessment's 1984 report on groundwater, and we will recommend that Congress mandate source controls for a large number of source categories. While we urge that a portion of these source controls be implemented through individual permits, we recognize the need for general permits for certain ubiquitoussources of contamination.

Fifth, a Federal groundwater protection program must provide for fair and equitable treatment of all citizens, regardless of their place of residence. Just as citizens of particular states should not be denied minimum national protections, the citizens of rural areas must not be discriminated against through a program that ignores the needs of private or small community well users.

Currently there may be from 37 to 48 million Americans, living primarily in rural areas, who rely on private drinking water wells. Those drinking water wells are not covered by the mandates of the Safe Drinking Water Act. And while this particular exclusion is probably a reasonable one, it unfortunately translates into a lack of protection for the waters which feed those wells. When a pollution problem does occur, private well users or small community well users are generally least able to deal with the consequences. Without the economies of scale of large water supplies, they are unable to spread out the costs of monitoring, treatment or water supply replacement among numerous water users.

Our recognize these problems and call for several actions to address them. We support the adoption of a national goal of safe drinking water for all Americans -- not just those served by public water supply systems. We recommend that states be required to set up programs for both water quality monitoring and water well replacement for private well owners. The costs of these programs should be shared by water users along with the state and Federal governments. Further, we urge Congress to call a halt to any Federal program or policy, such as EPA's groundwater classification proposals, which would allow for groundwater pollution simply on the rationale that only "small populations" would be affected.

Sixth, a new national groundwater law must reject the notion that the groundwater resource lends itself to control programs based on predictions of assimilative capacity or calculations of "acceptable" pollutant loadings. Our aim must be to protect the full resource, not degrade selected segments of it. In this context, however, groundwater classification -- based on adequate data about aquifer flow systems -- can be used to further broad-based protection goals.

Under our proposal, anticipatory classification -- in programs such as wellhead protection and critical aquifer protection areas -- would be utilized to provide for an additional level of protection for particularly vulnerable or particularly crucial groundwater resources. Imposition of additional controls, over and above those required by the Best Practicable or Best Available Methods, would be appropriate in areas designated by the states for such protections. In no case should classification be used to lessen the stringency of established source control standards.

Seventh, water quality standards best serve the purposes of groundwater protection when they function as an adjunct to source controls, not a license to pollute. Thus, standards should be set and utilized in the context of a program which prevents rather than merely responds to contamination.

Our proposal calls for the setting of groundwater quality standards which are based not only on human health considerations but also on environmental impacts. These standards should be set so as to prevent any adverse health effects on water users, and they should function to assure that surface water quality is maintained. And in addition to individual standards for particular contaminants, we would recommend a generic standard for total synthetic organic contamination to provide a margin of safety against potential additive or synergistic health risks associated with multiple chemical combinations.

Again, while initial imposition of source controls should not be dependent upon the detection of a groundwater contaminant, the detection of selected percentages of the groundwater

standards should be used to trigger appropriate investigation and response actions to address groundwater discharges. In this way, detection of contamination at trigger levels may result in enhanced controls applied at a particular site or across an entire category of sources. Different detections may call for differing degrees of response under such a program, but in no case should regulatory officials be allowed to simply watch a concentration level rise to meet a standard before possible mitigating measures are explored and implemented. Standards then become enforceable -- not obstacles to enforcement.

Finally, we must set aside the false notion that the states will succeed in protecting groundwater without significant Federal involvement. In our view, it is time -- or past time -- for the Federal government to assert its rightful role in the protection of the natural resource which we share with citizens in all states and with future generations. Afterall, as the National Agricultural Chemicals Association has pointed out in a recent report on pesticide contamination in Iowa, "groundwater flow is not restricted by state boundaries."

Thus, the role of the Federal government with regard to groundwater should be one similar to its widely-accepted role in other resource protection areas. We believe that if we are going to develop and implement groundwater programs that have some hope of being effective, of providing equal protection for citizens from Minnesota to Mississippi, of lessening the likelihood of "pollution havens" in economically depressed states, and of leaving future generations with a clean water supply, then we must place the Federal government in a leadership role. There must be a Federal "gorilla in the closet."

Some have called for "a new Federal-state partnership" for groundwater protection, and we join that call enthusiastically if it means a concerted effort to streamline and improve upon the relationship of Federal and state partners in environmental programs.

We agree that the states -- and the local governments as well -- have an important role in groundwater protection, but to those who would argue that groundwater protection duties should be placed solely and exclusively with the states, we must ask: What is it that gives the public any confidence that the groundwater situation will improve? After all, the states have had the authority to act, and the contamination problems that have now finally driven us toward this national debate have happened, as it were, on their watch.

Eventually we believe that a consensus will emerge for a Federal-state partnership which is similar to that encountered in other areas of natural resource protection. Under the Clean Air Act, the Clean Water Act and the Surface Mining Reclamation and Control Act, we have programs which recognize that the Federal

government-- farthest removed from local politics and economic pressures -- is in the best position to serve as the steward of resources for the future. In addition, it is the Federal government that can act to pull recalcitrant states and industries up to a basic minimum level of protection and assure that states that choose to act aggressively to protect groundwater will not be penalized economically for their far-sightedness. Further it is clear that when it comes to research -- on the health effects of various chemicals or on the best means of controlling pollutants from particular sources -- our resources are most effectively spent when they are expended once at the Federal level rather than 50 times over.

Of course, we understand well that there are not now and not likely to ever be the kind of Federal resources that would provide for direct implementation of all aspects of a groundwater protection program at the Federal level. The states are currently and, under our scheme will continue to be, on the front-line of program implementation.

Mr. Chairman, we would again remind the Committee that it has taken a long time to understand that we have a problem which merits some action. Perhaps ever since the days of the Ohio Supreme Court decision which declared groundwater mysterious, occult and beyond regulation, our nation has clung to erroneous notions that groundwater is immune from contamination. When we began finding cases of contamination, we altered our notions only slightly and concluded that they must be isolated instances. These so-called isolated instances now have cost us a great deal not only in terms of cleanup dollars but also -- and perhaps more importantly -- in needlessly squandered public trust.

While we see no sense now in deploring what we haven't done, we also see no sense in delay. We urge the Members of Congress to set out a range of options for action, including ones based on the principles I have outlined today. We ask that you act with haste to scrutinize those options and then to choose the most effective, equitable and expeditious means of protecting the nation's groundwater.

A comprehensive groundwater approach along these lines will, no doubt, be subject to considerable controversy, since it will have to call for raising considerable revenue. But to those who argue that we cannot afford to have the Federal government protect our groundwater, we urge a close consideration of the costs of <u>not</u> doing so. A decision to delay a Federal prevention program is, in effect, a decision to subsidize today's pollution at the cost of future generations. And as one writer has noted, "...this type of subsidy is even more dangerous than the monetary kind...." The danger of this sort of subsidy is great, warns that writer, "...because it is paid in a currency that is not replaceable...." In this case, the lost currency will be the nation's clean water.

Again, I thank you for this opportunity to share our views. I would be happy to answer any questions that the Members may have.